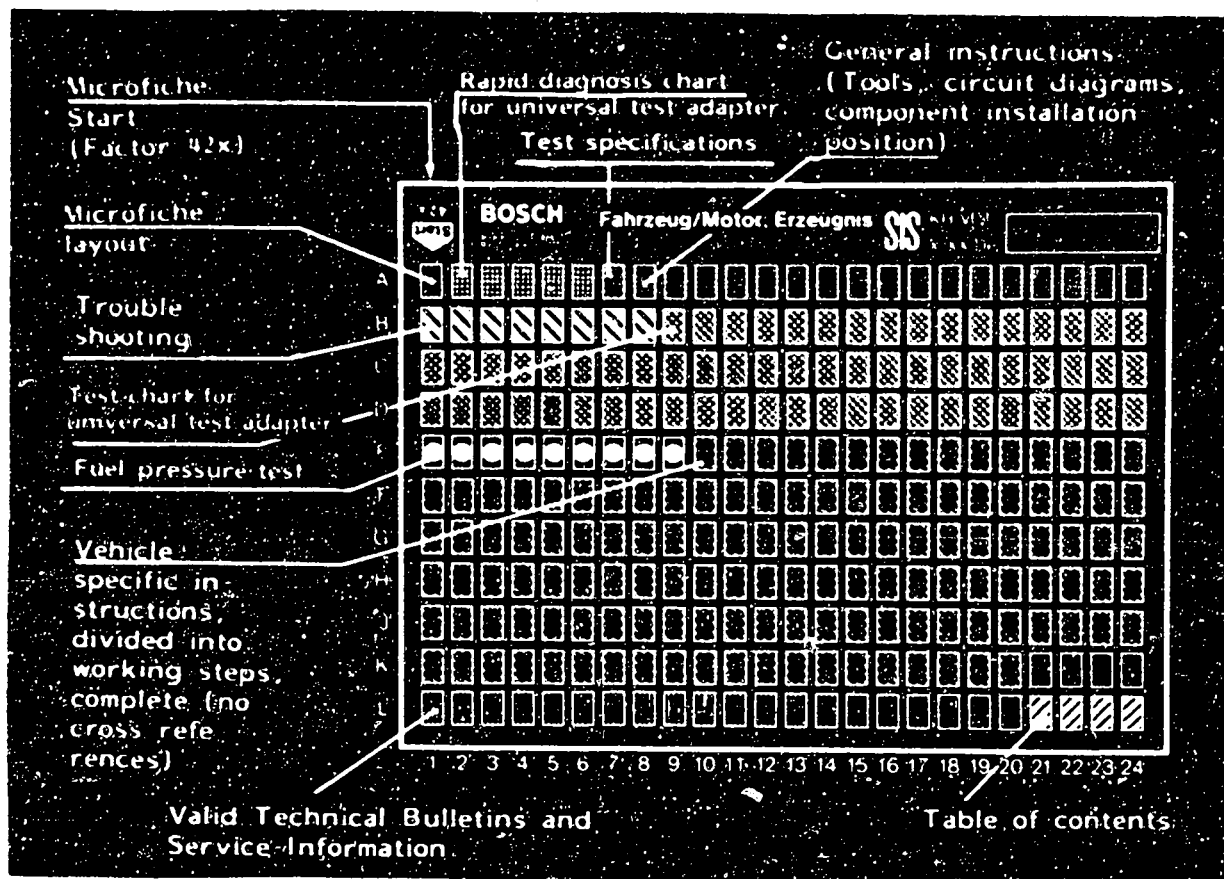


Microfiche layout



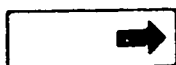
1. Read from left to right

2. Title of microfiche (appears on each coordinate)

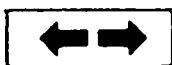
E 16	Product/assembly/test step	
	Vehicle/engine	

Coordinate

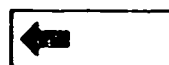
3. Limits of section



Beginning



Mid-section



End



One-page section

4. Purely vehicle-specific passages in the text are marked with a vertical bar.

5. Reference to relevant working steps in the test specifications, e.g. coordinate C6.

C 6

A1

Trouble-Shooting Plan



Rapid diagnosis chart for L-Jetronic universal adapter

The following rapid diagnosis chart makes it possible for the experienced L-Jetronic expert to quickly check the electrical part of the system using the L-Jetronic universal adapter.

The rapid diagnosis chart contains the following information:

- Switch positions on universal adapter
- Sequence of test steps
- Notes on how to operate the universal adapter or other components
- Readings on the multimeter
- References to coordinates of the relevant detailed testing and trouble-shooting program.

If detailed information and instructions are necessary, always proceed according to the trouble-shooting program starting on Coordinate B 1/B 2.



Rapid diagnosis chart for L-Jetronic universal test adapter

<u>Test step</u>	<u>Switch position</u>		<u>Remarks</u>	<u>Test specifications (reading)</u>	<u>See Coordinates for trouble-shooting</u>
	V	Ω			
1	3	-	Shift gear to neutral. Operate starting motor. Measure voltage.	8...15 V	B 11
2	4	-	Shift gear to neutral. Operate starting motor. Measure voltage.	8...15 V	B 15
3	5	-	Shift gear to neutral. Operate starting motor. Measure voltage pulses with motortester.	Ignition pulses on motortester	B 19
4	6	-	Ignition "ON". Measure voltage.	8...15 V	B 21
5	7	-	Ignition "ON". Measure voltage.	8...15 V	B 23
6	8	-	Ignition "ON". Measure voltage.	8...15 V	C 3
7	9	-	Ignition "ON". Measure voltage.	8...15 V	C 7
8	10	-	Ignition "ON". Measure voltage.	8...15 V	C 11
9	11	-	Ignition "ON". Deflect air-flow sensor flap. Measure voltage.	8...15 V	C 15
10	12	-	Ignition "ON". Measure voltage.	8...15 V	C 19
11	13	-	Ignition "ON". Measure voltage.	8...15 V	C 21
12	14	-	Ignition "ON". Measure voltage.	8...15 V	D 1

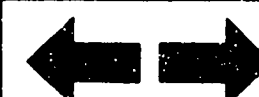
A3

Rapid diagnosis chart universal test adpt.
BMW 745i Turbo



A4

Rapid diagnosis chart universal test adpt.
BMW 745i Turbo



Rapid diagnosis chart for L-Jetronic universal test adapter					
Test step	Switch position		Remarks	Test specifications (reading)	See Coordinates for trouble-shooting
	V	Ω			
13	▼	6	Measure resistance. Deflect air-flow sensor flap.	80...1000	D 5
14	▼	7	Measure resistance.	260...520	D 7
15	▼	8	Measure resistance.	400...800	D 9
16	▼	9	Measure resistance. Accelerator in rest position.	0...10	D 11
17	▼	10	Accelerator in full-load position. Measure resistance.	0...10	D 13
18	▼	11	Measure resistance.	30 Ω ..30 k Ω (depends on temperature)	D 15
19	▼	12	Measure resistance.	30 Ω ..30 k Ω (depends on temperature)	D 17
20	▼	13	Measure resistance.	0...10	D 19
21	▼	14	Measure resistance.	0...10	D 21
22	▼	16	Measure resistance. Operate switch.	0...10	D 23

A5

Rapid diagnosis chart universal test adpt
BMW 745i Turbo


A6

Rapid diagnosis chart universal test adpt
BMW 745i Turbo



- Idle speed 850...950 min⁻¹
- Exhaust-gas setting
CO concentration
with engine at normal operating temperature
(81 model): 0.5...2.5 % by vol. CO
(82 model): Less than 1.5 % by vol. CO
- Fuel pressure 2.3...2.7 bar
- Fuel pump delivery Min. 1050 cm³/30 s
- Solenoid-operated injection valve 2...3 Ω

B7

● <u>Sensors</u>	Temperature sensor I	Temperature sensor II	
	(Intake air)	(Engine temperature)	
Ambient temp. (+15-30°C):	1.45...3.3 kΩ	1.30...3.6 kΩ	
Normal op. temp. (approx. 80°):	280...360 Ω	250...390 Ω	
● <u>Thermo-time switch</u>	Electrical internal resistance:		
	"G" and ground	"W" and ground	G and W
Ambient temp. (below +30°C):	25...40Ω	0Ω	25...40Ω
Normal op. temp. (above 40°C):	50...80Ω	100...160Ω	50...80Ω

- Auxiliary-air device 30...65 Ω
- Air-flow sensor
Resistance between term. 7 and term. 8
(Deflect air-flow sensor flap): 200...1000 Ω
- Relay set:
Resistance measurement between term 86b
(positive terminal of ohmmeter)
and term. 85: 70...500 Ω

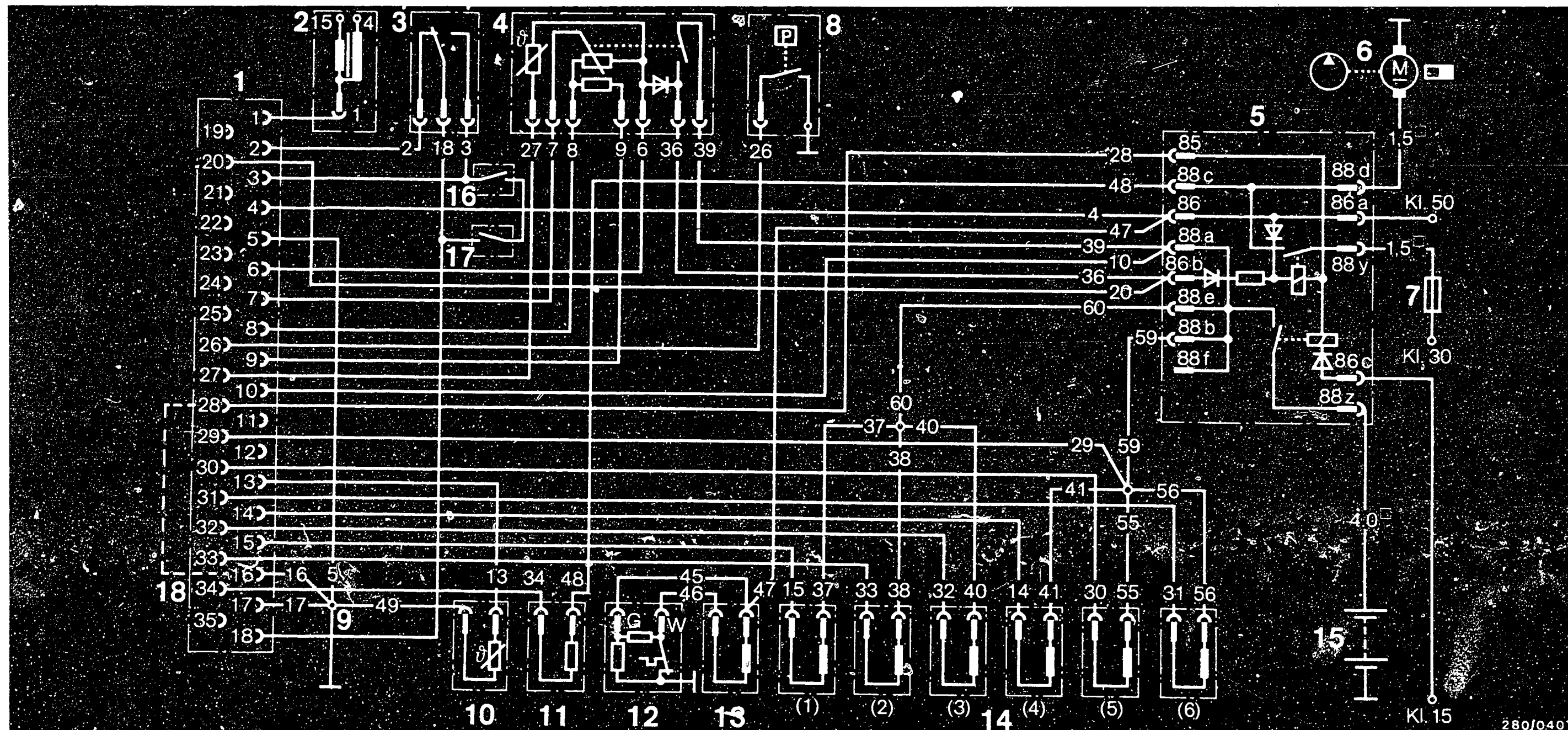
B5

- See equipment and Autodata microfiches for settings for ignition, valve clearance and other engine data.

A7

Test specifications - L-Jetronic
BMW 745i Turbo





Electrical terminal diagram of L-Jetronic for 1981 model

- | | | |
|---------------------------|-------------------------------------|--|
| 1 = Multiple plug | 7 = Pump fuse | 13 = Start valve |
| 2 = Ignition coil | 8 = Intake-manifold pressure switch | 14 = Solenoid-operated injection valve |
| 3 = Throttle-valve switch | 9 = Central ground | 15 = Battery |
| 4 = Air-flow sensor | 10 = Temperature sensor II | 16 = Information on engine speed via engine-speed switch |
| 5 = Relay set | 11 = Auxiliary-air device | 17 = Information on intake-manifold pressure via pressure switch |
| 6 = Electric fuel pump | 12 = Thermo-time switch | 18 = Bridge in control unit |

A8

Electrical terminal diagram
BMW 745i Turbo

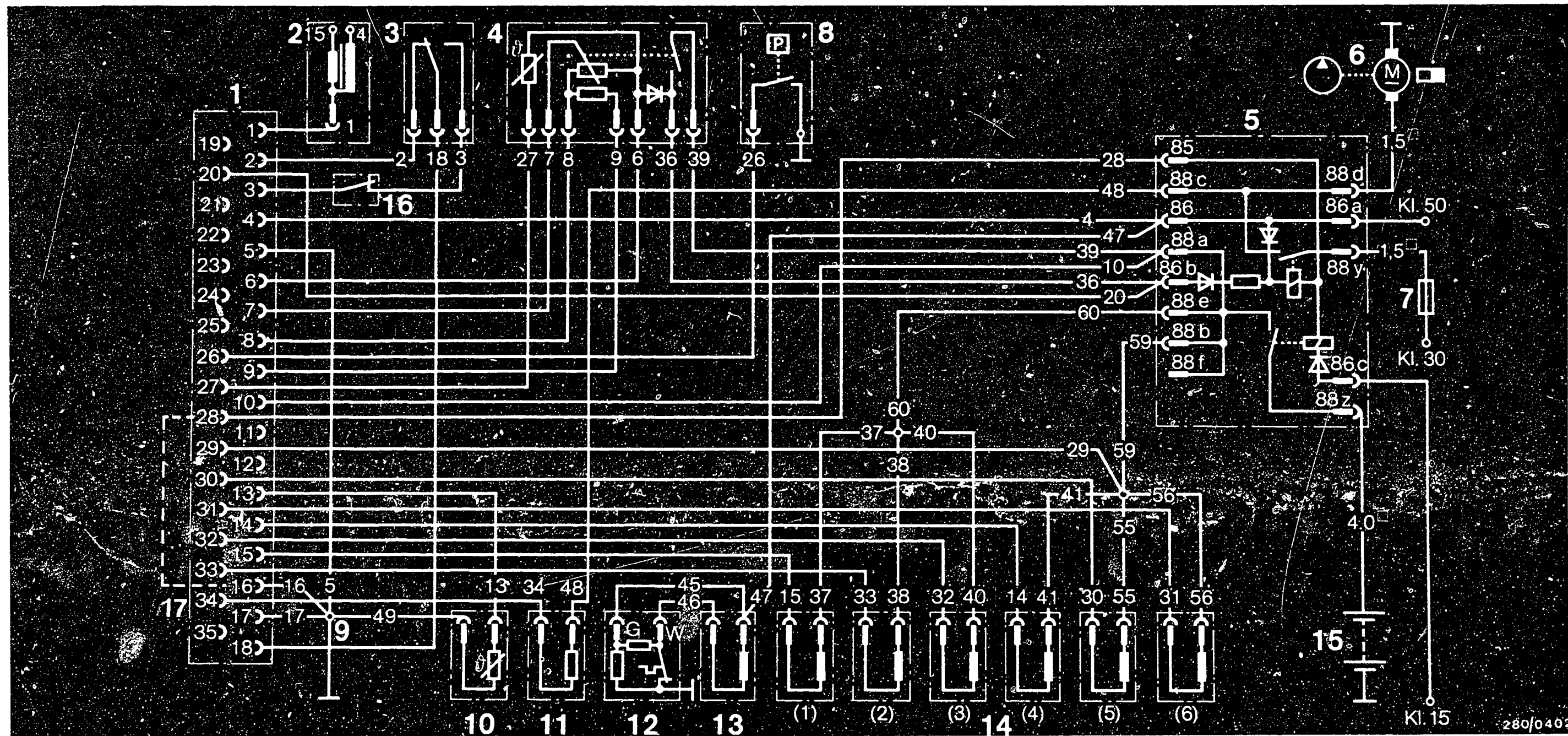


A9

Electrical terminal diagram
BMW 745i Turbo



280/0401



Electrical terminal diagram of L-Jetronic for 1982 model

- | | | |
|---------------------------|-------------------------------------|--|
| 1 = Multiple plug | 7 = Pump fuse | 13 = Start valve |
| 2 = Ignition coil | 8 = Intake-manifold pressure switch | 14 = Solenoid-operated injection valves |
| 3 = Throttle-valve switch | 9 = Central ground | 15 = Battery |
| 4 = Air-flow sensor | 10 = Temperature sensor | 16 = Information on engine speed via engine-speed switch |
| 5 = Relay set | 11 = Auxiliary-air device | 17 = Bridge in control unit |
| 6 = Electric fuel pump | 12 = Thermo-time switch | |

A10

Electrical terminal diagram

BMW 745i Turbo

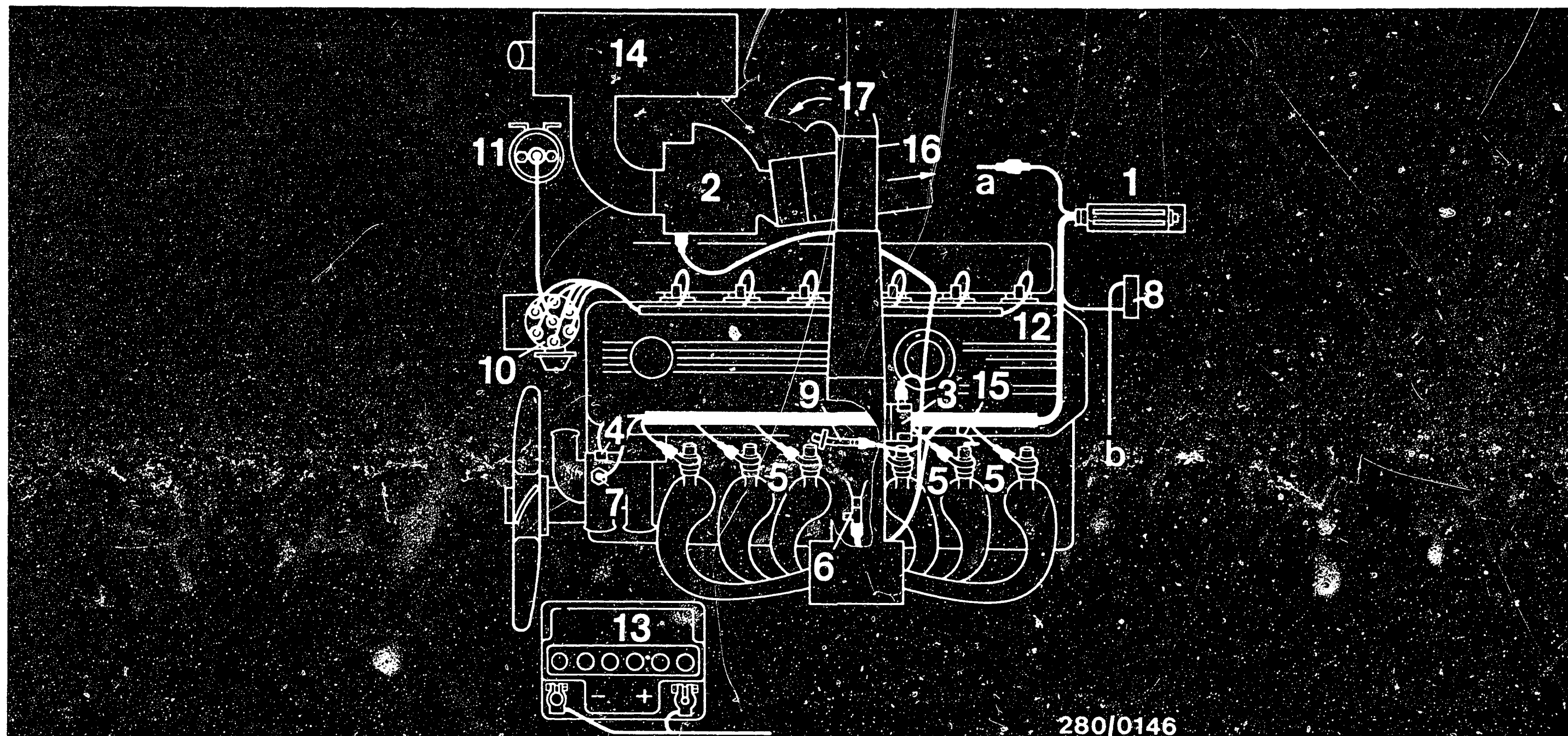


A11

Electrical terminal diagram

BMW 745i Turbo





280/0146

Electrical wiring diagram of L-Jetronic and arrangement of individual components

- | | | | |
|---------------------------|---------------------------|------------------------------|----------------------------|
| 1 = Control unit | 6 = Start valve | 11 = Ignition coil | 16 = To turbocharger |
| 2 = Air-flow sensor | 7 = Thermo-time switch | 12 = Jetronic wiring harness | 17 = To charge-air cooler |
| 3 = Throttle-valve switch | 8 = Relay set | 13 = Battery | a = Lead from term. 1 |
| 4 = Temperature sensor | 9 = Auxiliary air device | 14 = Air filter | ignition coil |
| 5 = Injection valve | 10 = Ignition distributor | 15 = Central ground | b = Vehicle wiring harness |

A12

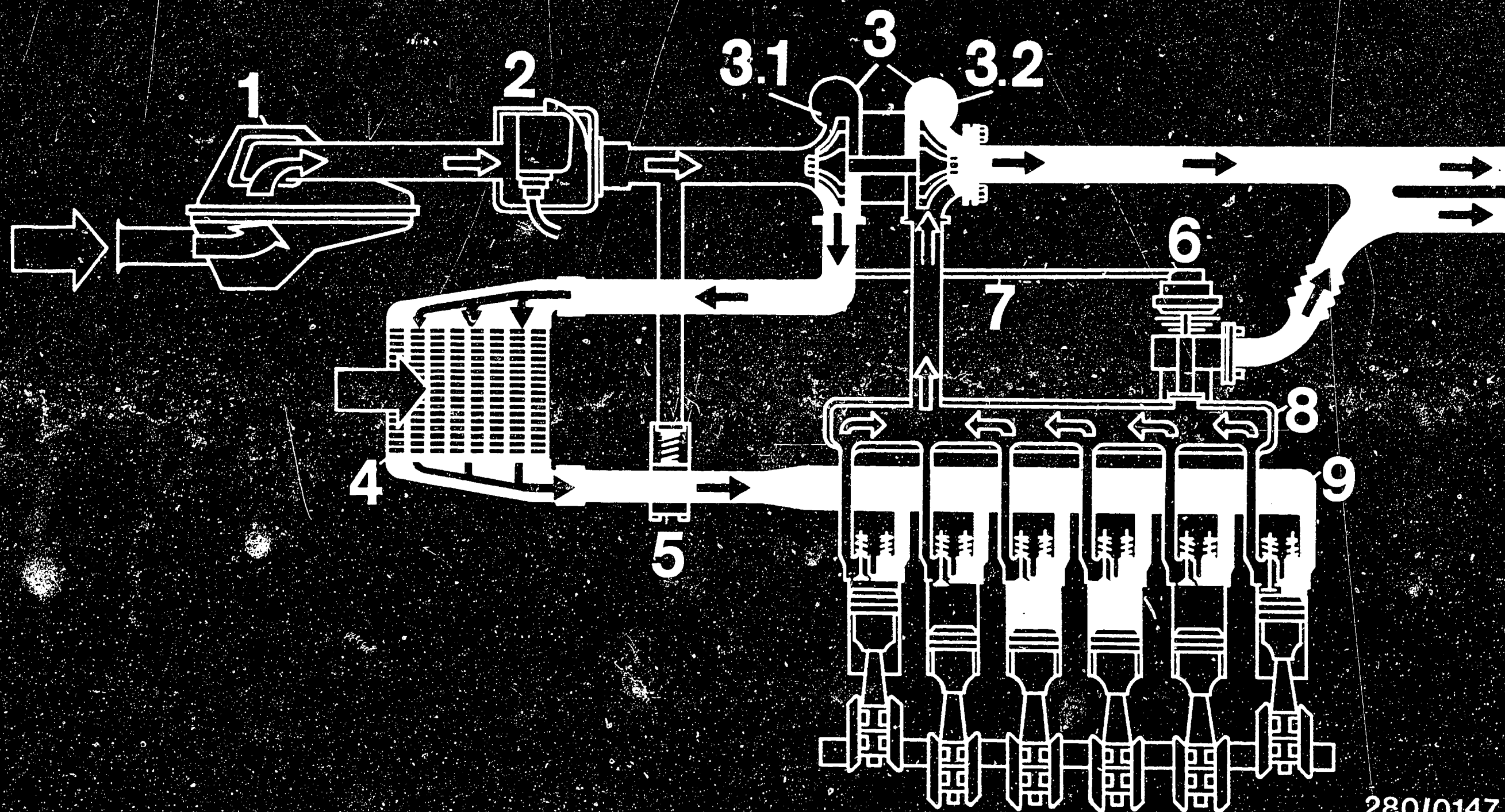
Electrical wiring diagram
BMW 745i Turbo



A13

Electrical wiring diagram
BMW 745i Turbo





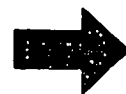
280/0147

Diagram of air hoses

- | | |
|---------------------|-----------------------|
| 1 = Air filter | 3.1 = Compressor |
| 2 = Air-flow sensor | 3.2 = Turbine |
| 3 = Turbocharger | 4 = Charge-air cooler |

- | |
|------------------|
| 5 = Bypass valve |
| 6 = Waste gas |
| 7 = Control line |

- | |
|----------------------|
| 8 = Exhaust manifold |
| 9 = Intake manifold |



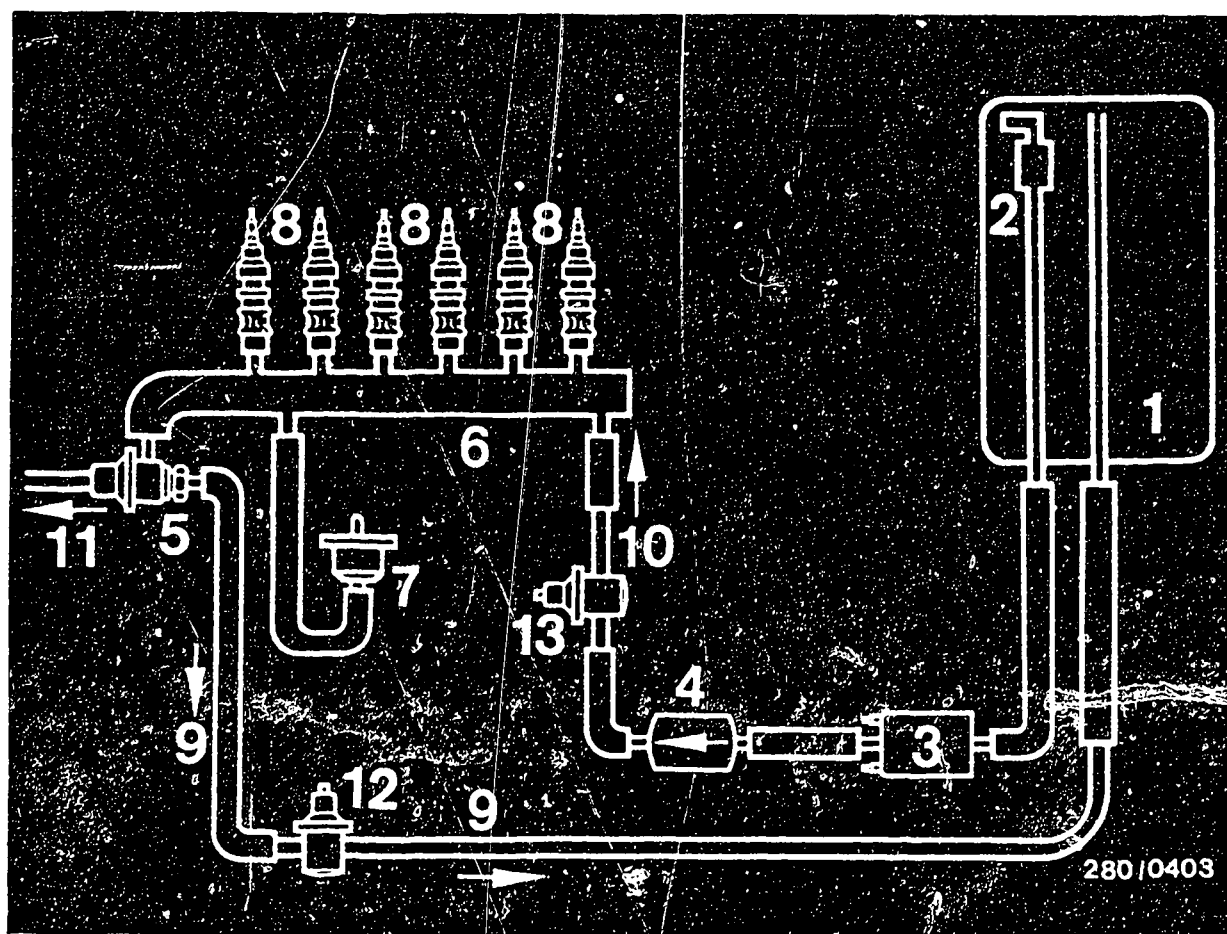


Diagram of fuel lines

- 1 = Fuel tank
- 2 = Pre-supply pump (in tank)
- 3 = Electric fuel pump
- 4 = Fuel filter
- 5 = Pressure regulator
- 6 = Fuel-distribution pipe
- 7 = Start valve
- 8 = Solenoid-operated injection valves
- 9 = Fuel return line
- 10 = Fuel delivery line
- 11 = To intake manifold
- 12 = 1st fuel-line-pressure damper
- 13 = 2nd fuel-line-pressure damper (only as of 82 model)

The fuel delivery and return lines are routed on the left-hand underside of the vehicle.

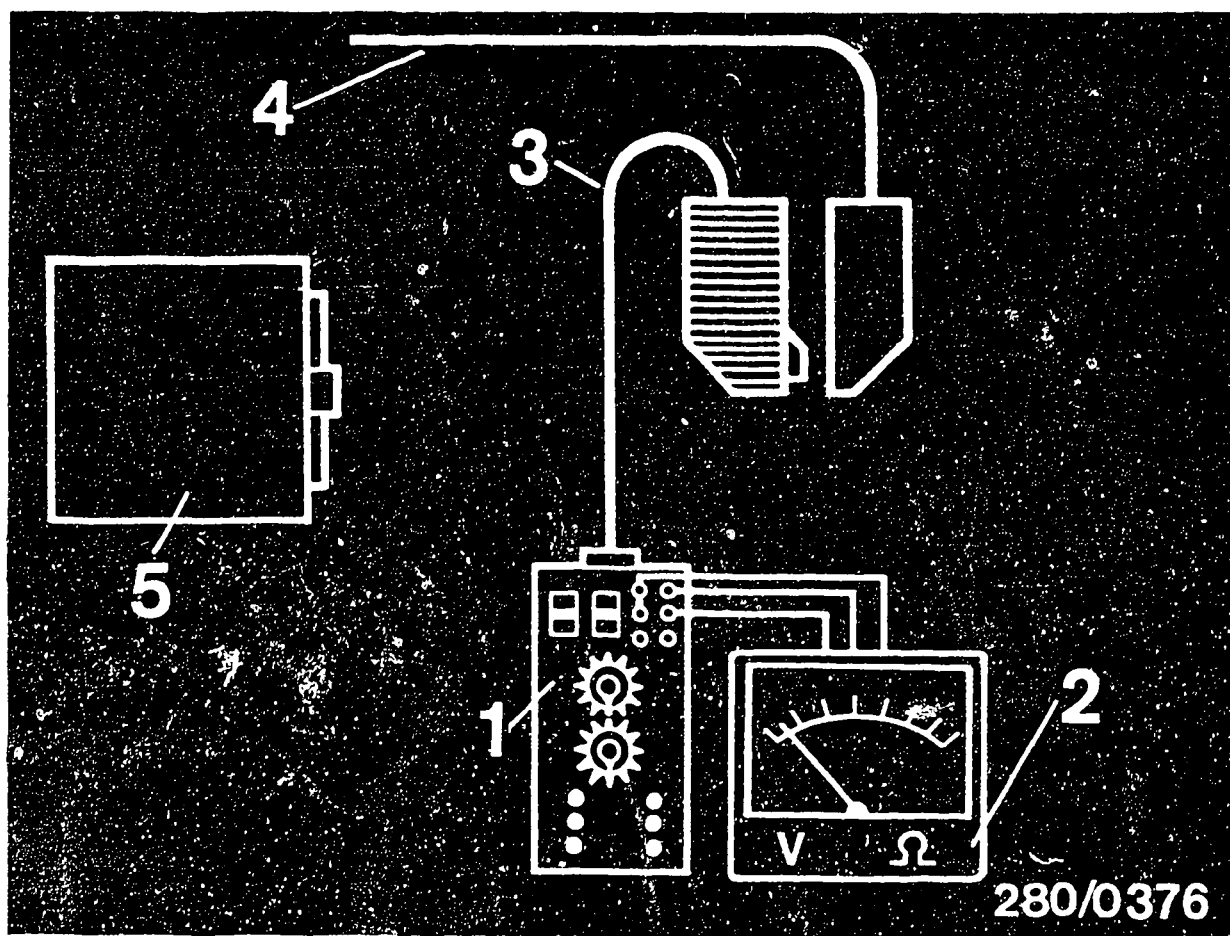


Test equipment and tools

Universal adapter	ETT 018.18	0 684 101 801
Adapter lead		1 684 463 129
Motortester	e.g. MOT 002.00	0 684 000 200
Exhaust-gas analyzer	e.g. ETT 008.00	0 684 100 800
Calibrated infra-red exhaust-gas analyzers	ETT 008.04	0 684 100 804
or	ETT 008.05	0 684 100 805
Pressure gauge	Quality class 1.0 = 6 bar, 0.1 bar graduations	1 687 231 154
Three-way line		KDJE P-100/13
Test lead		1 684 463 093
Pressure tester or Pressure tester (no longer available)		KDJE-P 100
Parts set		KDEP 1034
Electrics tester or multimeter	e.g. ETE 014.00	1 287 010 704
	e.g. Philips PM 2517 X	0 684 101 400
	e.g. Mislco Master 50 K	
	e.g. Chinaglia Cortina	
Solenoid-operated injection valve		0 280 150 121

Use suitable, commercially available tools for fitting and removing the idle-CO-anti-tamper device on the air-flow sensor.



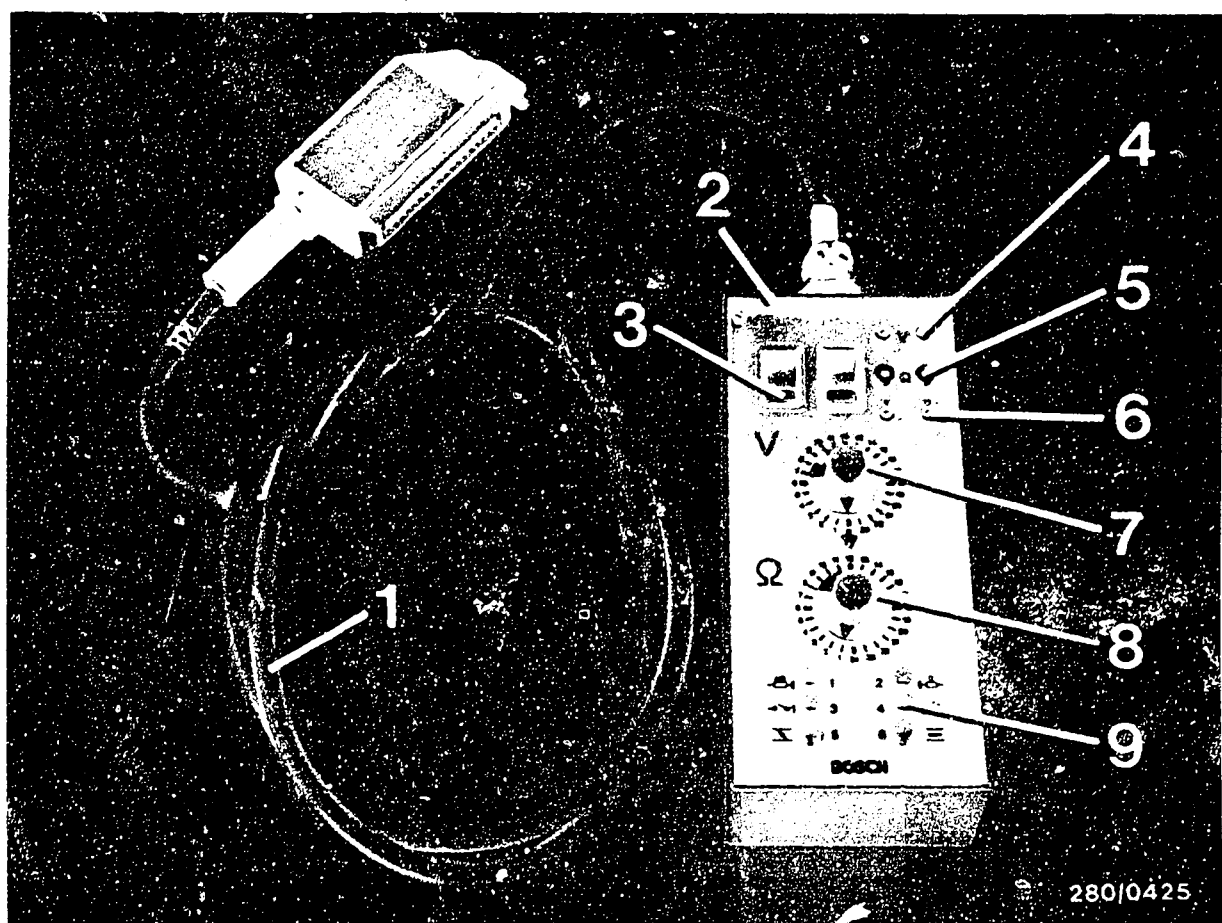


- 1 = universal test adapter 4 = vehicle wiring harness
 2 = multimeter 5 = L-Jetronic control unit
 3 = adapter lead (L-Jetronic)

General: The universal test adapter is plugged onto the vehicle wiring harness with the adapter lead.

Caution: Connect and disconnect the universal test adapter only with the ignition off.

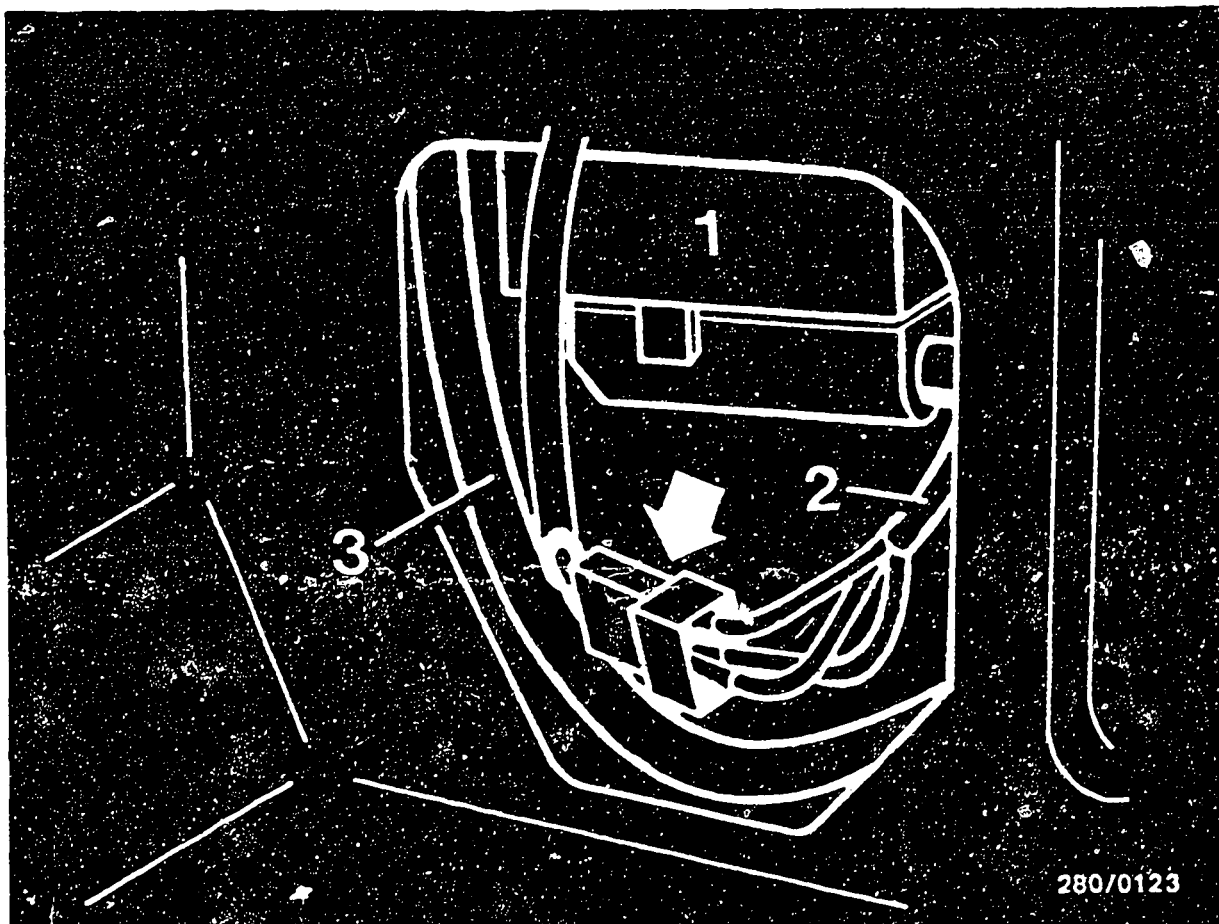
Testing: For testing, connect a multimeter with R_i min. $20\text{ k } \Omega/V$ to the test adapter. It is also possible for the signal from term. 1 of the ignition coil to be measured with a motortester via the special input.



Universal adapter with adapter lead for L-Jetronic

- 1 = adapter lead (part No.: 1 684 463 129)
- 2 = universal adapter (part No.: 0 684 101 801)
- 3 = test wells (for motortester)
- 4 = test sockets (for voltage measurement)
- 5 = test sockets (for resistance measurement)
- 6 = test sockets (not yet occupied)
- 7 = program switch "volt"
- 8 = program switch "ohm"
- 9 = button panel (not occupied for L-Jetronic)





280/0123

- 1 = control unit
- 2 = lead from ignition coil term.1 to control unit term.1
- 3 = Jetronic wiring harness

Installation position of components

The indications "right" and "left" apply when viewed from behind the vehicle.

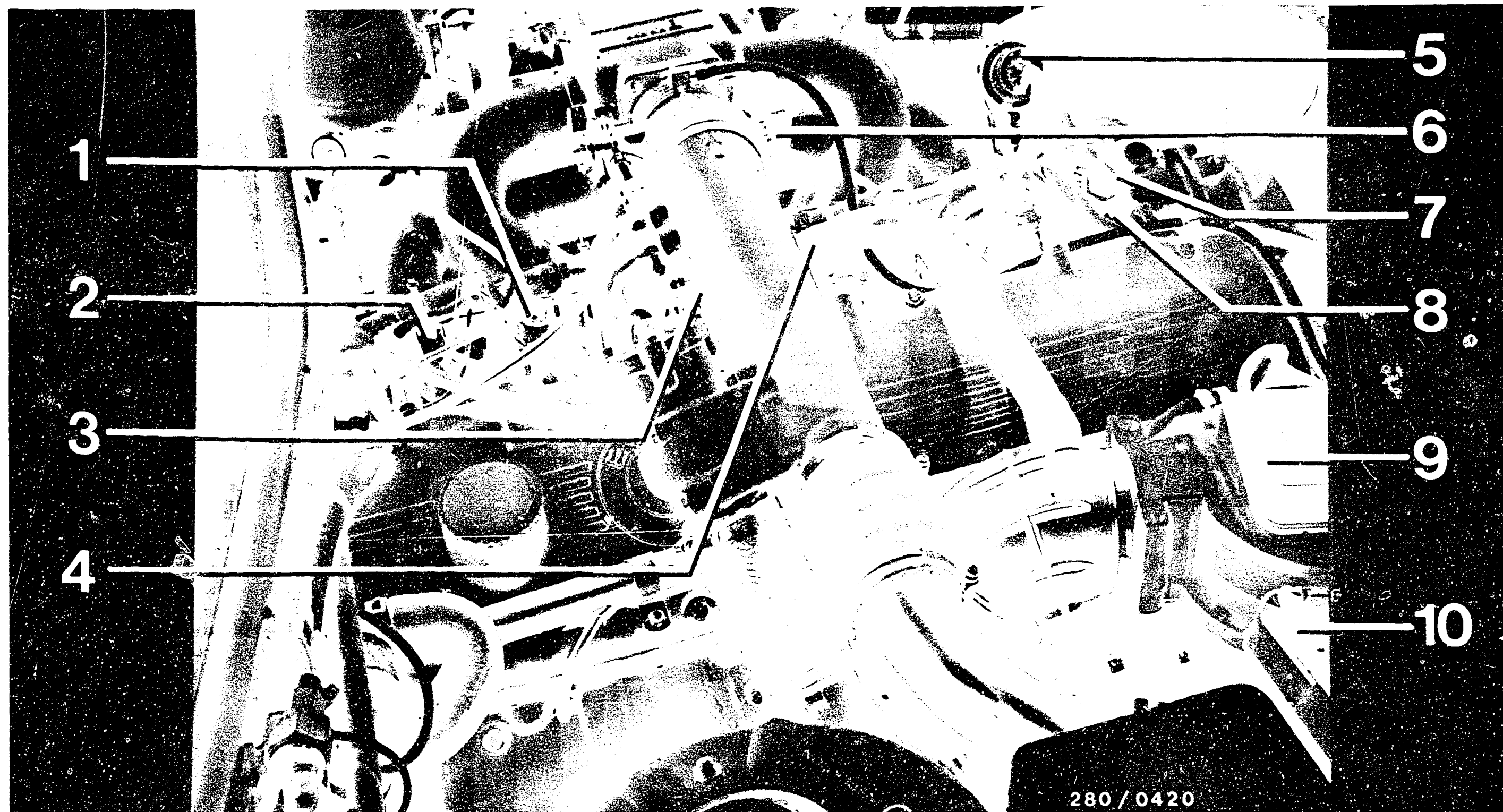
Control unit

The control unit is in the right-hand front passenger footwell behind a cover where it is fastened in position by three screws.

Caution!

Do not mix up connector (arrow) since, otherwise, the L-Jetronic control unit will be destroyed when starting.





Overall view of engine

1 = Solenoid-operated injection valve
 2 = Central ground
 3 = Auxiliary-air device (black plug)
 4 = Start valve (blue plug)

5 = Pressure regulator
 6 = Throttle-valve switch
 7 = Thermo-time switch (brown plug)

8 = Temperature sensor II (white plug)
 9 = Air-flow sensor
 10 = Air filter

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Installation position of components

BMW 745i Turbo



A22

Installation position of components

BMW 745i Turbo



<u>Electric fuel pump:</u>	Underneath vehicle, on right-hand side, near rear axle.
<u>Fuel filter:</u>	Underneath vehicle, on right-hand side, near rear axle.
<u>Fuel pump fuse:</u>	In central fuse box (fuel pump).
<u>Fuel-line-pressure damper:</u> 1)	Delivery line: Between intake manifold and firewall. Return line: After pressure regulator in return line.
<u>Pressure switch:</u>	On right-hand side, between fuse box and Mcpherson strut.
<u>Engine-speed switch (speed relay):</u>	Relay mounted on fuse box.
<u>Ground lead of electric fuel pump:</u>	Underneath rear seat bench, on left-hand side (recess) ground point on vehicle body.

1) In vehicles with control unit 0 280 001 124 (as of 9.80 date of manufacture): only one fuel-line-pressure damper in delivery line.

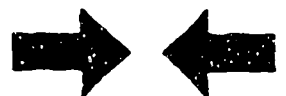
In vehicles with control unit 0 280 001 127 (as of 9.81 date of manufacture): 2 fuel-line-pressure dampers, one in delivery line and one in return line.



Important general information

1. Never start engine without securely connected battery.
2. Do not use a starting aid with more than 16 V or a fast charger for starting.
3. Never disconnect battery from vehicle electrical system with engine running.
4. Disconnect battery from vehicle electrical system when fast charging.
5. Remove control unit at temperatures above 80°C (paint-drying installation).
6. Ensure that all connectors of wiring harness are properly attached.
7. Never connect or disconnect wiring-harness plug of control unit with ignition switched on.
8. When testing compression, cut the red power supply lead between battery and relay set by disconnecting the plug-in connection.
This ensures that the voltage supply for the L-Jetronic and therefore also for the injection valves is interrupted. Undesired injecting is thus prevented.
9. Remove the L-Jetronic control unit before carrying out electric welding work (e.g. spot welding).
10. When using the following trouble-shooting program it is assumed that the engine is in proper working order and that the ignition is correctly set. The electrical system must be checked and, if necessary, repaired.

In order to carry out the testing operations described in this manual and in order to assess the components, you should be familiar with the L-Jetronic and how it works. The essential points regarding the operation and construction of the L-Jetronic are described in Technical Instruction VDT-U 3/3 En.



Trouble-shooting

The following trouble-shooting programs are designed to enable workshop employees, using the L-Jetronic tester and other suitable test equipment, to quickly locate causes of trouble on the L-Jetronic.

Depending on the level of knowledge and experience of the mechanic, a choice can be made between the following procedures:

- Detailed step-by-step trouble-shooting for employees with little experience or practice on L-Jetronic vehicles.
- Pin-pointed direct trouble-shooting for trained, experienced employees who have had a great deal of practice on L-Jetronic vehicles.

B3**B5**

Both trouble-shooting programs begin by checking the electrical/electronic part of the L-Jetronic with the aid of the L-Jetronic tester (analog) ETJ 002.02. In this way, the wiring harness with the connected components (including control unit) is soon checked for proper electrical operation and faults are quickly located.

If no fault is found using the L-Jetronic tester (analog), continue trouble-shooting with the detailed or the direct trouble-shooting program.

B1

Trouble-shooting

BMW 745i Turbo

**B2**

Trouble-shooting

BMW 745i Turbo



1. Detailed step-by-step trouble-shooting

1.1 Test with universal test adapter

This test must come at the beginning of the test program and must be performed from beginning to end (Coordinates B9...E1)

1.2 Fuel pressure test

The fuel pressure test must come immediately after the test with the universal test adapter and must be performed from beginning to end (Coordinates E2...E11).

1.3 Trouble-shooting according to customer complaints (symptoms of trouble)

The table below contains possible symptoms of trouble and gives the first coordinate of the relevant detailed trouble-shooting program in the column on the right.

The trouble-shooting program consists of logically ordered test procedures for all individual components of the L-Jetronic. If, after completing the trouble-shooting program for an assumed trouble, the fault has not been detected or remedied, take a new symptom of the trouble and work through another program.

<u>Customer complaint (symptom of trouble)</u>	<u>Universal test adapter</u>	<u>Fuel pressure test</u>	<u>Coordinates</u>
1. Engine fails to start or starts only with great difficulty	B 9	E 2	E 12
2. Engine starts but then dies	B 9	E 2	F 9
3. Uneven engine idle	B 9	E 2	G 1
4. Poor throttle take-up	B 9	E 2	G 2
5. Engine missing under all operating conditions	B 9	E 2	H 9
6. Fuel consumption too high	B 9	E 2	J 9
7. No maximum engine power	B 9	E 2	J 21
8. CO concentration at idle too high or too low	B 9	E 2	K 11



2. Pin-pointed direct trouble-shooting

2.1 Test with universal test adapter

The test with the universal test adapter must come at the beginning of the test program and must be performed from beginning to end (Coordinates B9...E1).

2.2 Fuel pressure test

The fuel pressure test must come immediately after the test with the universal test adapter and must be performed from beginning to end (Coordinates E2...E11).

2.3 Trouble-shooting according to customer complaints

The table below contains various symptoms of trouble with several possible causes of the trouble in each case. The Coordinate reference field indicates the first coordinate of the test procedure for the respective L Jetronic component. If, after testing the individual components, the fault has not been detected or remedied, chose a new symptom of the trouble.

Customer complaint (symptom of trouble)

1.	Engine fails to start or starts only with great difficulty							
2.	Engine starts but then dies							
3.	Uneven engine idle, idle speed incorrect							
4.	Poor throttle take-up							
5.	Engine missing under all operating conditions							
6.	Fuel consumption too high							
7.	No maximum engine power							
8.	CO concentration at idle too high or too low							
<u>Cause</u> (component fault)								
B9	B9	B9	B9	B9	B9	B9	B9	Universal test adapter
E2	E2	E2	E2	E2	E2	E2	E2	Fuel press test, pressure regulator defective, relay set defective, fuel pump not operating, pump contact not closing
E20	F9		H1					Auxiliary-air device not opening
		G9						Auxiliary-air device not closing
F1	F13	G15	H1	H17	J17	K5	K15	Air-flow sensor defective, potentiometer test (noise test)
	F13			H17				Pump contact in air-flow sensor defective (engine stopped)
						K7		Engine-speed (speed relay), pressure switch (turbocharger)
		G9			J15			Solenoid-operated injection valve defective

B5

Trouble-shooting
BMW 745 i Turbo



B6

Trouble-shooting
BMW 745i Turbo



Customer complaint (symptom of trouble)

1. Engine fails to start or starts only with great difficulty

2. Engine starts but then dies

3. Uneven engine idle, idle speed incorrect

4. Poor throttle take-up

5. Engine missing under all operating conditions

6. Fuel consumption too high

7. No maximum engine power

8. CO concentration at idle too high or too low

Cause (component fault)

E20		G7						Thermo-time switch defective
F3	F15	G17	H5			K9	K19	Air-intake system leaking
		G11		H13	J15			Injection valves defective; connect test lead
E14								Start valve not opening
E18	F7	G7			J11		K17	Start valve leaking
				H23		K3		Insufficient fuel delivery (pre-supply pump defective)
E22					J13		K17	Temperature sensor II in engine defective
		G3	G23					Throttle valve not closing
						K1		Throttle valve not opening fully
				H11		K9		Poor central ground, loose contacts, faulty plug - in connections
		G17	H5	H11				Open circuit in wiring harness and plug-in connections; interference
			G23			J23		Throttle-valve switch defective
		G19	H7		J19		K13	CO exhaust gas setting too rich, idle adjustment
		G19	H7	J1			K13	CO exhaust gas setting too lean, idle adjustment, burbling
				J1		J23		Control unit defective

B7

Trouble-shooting

BMW 745i Turbo



B8

Trouble-shooting

BMW 745i Turbo



Test chart for universal test adapter with connected
L-Jetronic system adapter lead (1 684 463 129)
Test chart for BMW 745i Turbo

Carefully plug the universal test adapter onto the vehicle wiring harness. (Ignition must be off). Only the peripherals are tested.

For taking measurements, the multimeter (for voltage and resistance measurements) as well as a motortester must be connected to the universal test adapter.

The individual test steps are selected by means of two program switches (one for voltage measurements, the other for resistance measurements). Each program switch has 24 test positions, but not all of these are occupied for the L-Jetronic. Be sure to follow the instructions in the test chart.

Test steps 1...12 measure voltages during starting.
Caution: Set the multimeter to the voltage-measuring range.

Test steps 13...22 measure resistances
Caution: Set the multimeter to the resistance-measuring range. While trouble-shooting, ignition "OFF" and remove multiple plug of adapter lead.

The test specifications and operating instructions for the universal test adapter are given in the following test chart.

The control unit is in the passenger compartment on the front passenger side in the footwell behind a cover where it is fastened in position by three screws.



Requirements for correct test procedure:

1. Start testing with test step 1.
2. The sequence of the test steps must be kept to. In each case, the trouble-shooting set out below each test step is based on the trouble-shooting set out below the previous test steps.
Example: If, in test step 1, the ground connection term. 28 for the relay set is tested, this test is not repeated in the following test steps.
3. If an incorrect reading is obtained for a test step, this test step must be repeated after the fault has been remedied.

Note:

In the following test steps a wide border in the "operation" column indicates which operation has to be changed in comparison with the preceding test step.



Test step 1

Operation

Reading

Testing

Program switch position
"V":

3

Multimeter must
indicate

Component:

Program switch position:

1)

8...15 V.

Relay set
starting motor term. 50

Measuring equipment:
multimeter
(volt range)

Measuring range:
0...15 V

Connection:
test sockets red
(positive) and black

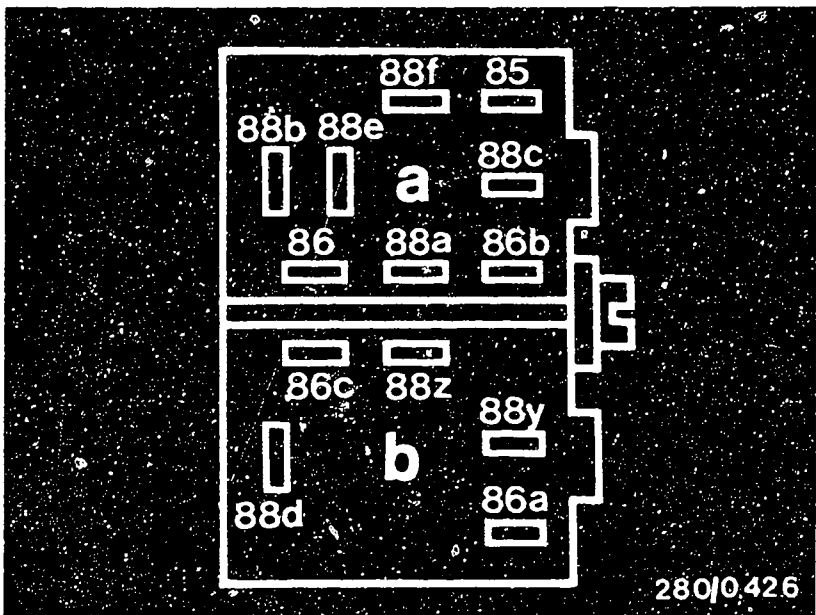
Operation in vehicle:
ignition "ON" and operate
starting motor

Operation:

Starting signal

Malfunction:

No voltage reading



Top view of connection
bases of relay set
(viewed from below)
a = Jetronic wiring harness
b = Vehicle wiring harness

Top view of multiple plug
K1.1 = term. 1

Trouble-shooting:

For all voltage measurements:

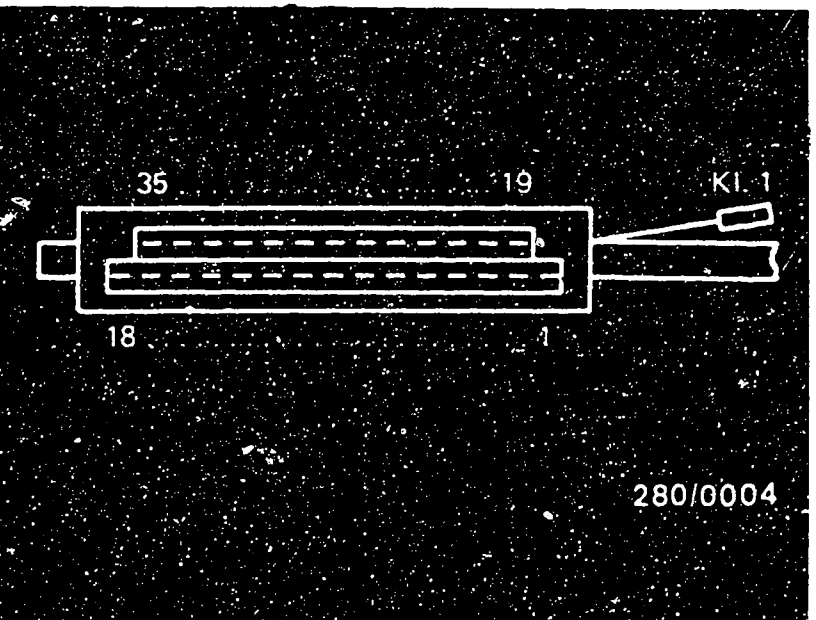
1. Set value 8...15 V (when operating starting motor)
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0Ω.
Important! Ignition "OFF" and ensure proper electrical connection when measuring.

Continued on B13/B14

1) Switch position not specified.



B 11

Test chart for universal test adapter
BMW 745i Turbo



B 12

Test chart for universal test adapter
BMW 745i Turbo



Voltage reading below 8 V:

Battery insufficiently charged or high voltage drops.

No voltage reading:

1. Voltage at relay set term.86a? If no voltage, test lead to starting motor term.50. Test ground connection from multiple plug term.5 to central ground.
2. Voltage at relay set term.80? If no voltage, replace relay set.
3. Test lead from relay set term.86 to multiple plug term.4.

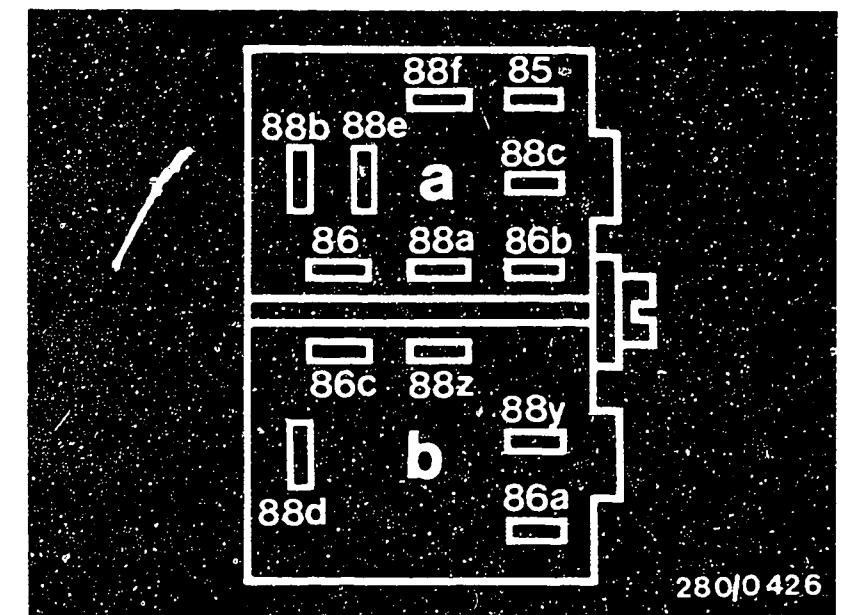
Eliminate contact resistances at the plug-connections.

Installation position of components:

Relay set: On firewall on right-hand side.

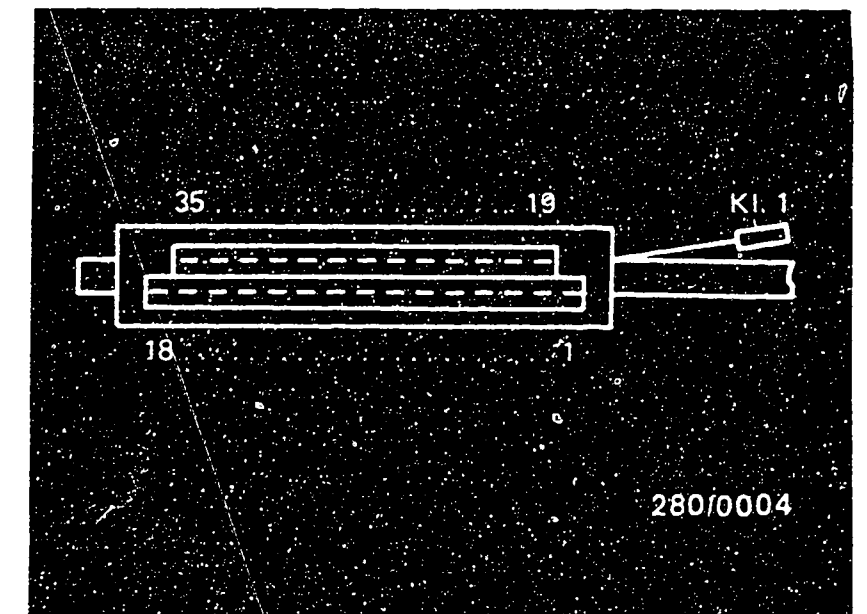
Central ground: Between 5th and 6th injection valves.

Control unit: Front passenger side, in footwell on right-hand side, behind a cover.



Top view of connection
bases of relay set
(viewed from below)
a = Jetronic wiring harness
b = Vehicle wiring harness

Top view of multiple plug
Kl. 1 = term. 1



B13

Test chart for universal test adapter
BMW 745i Turbo

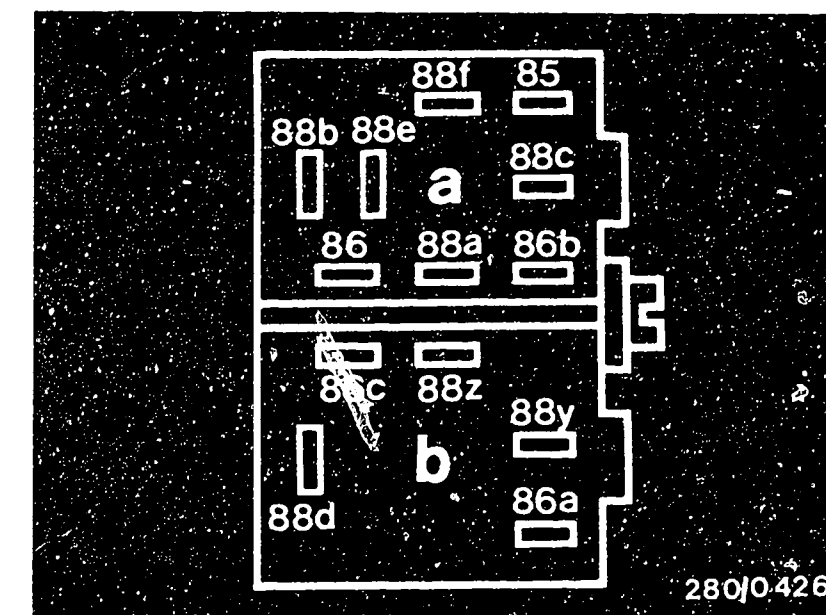


B14

Test chart for universal test adapter
BMW 745i Turbo



<u>Test step 2</u>			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch position</u> "V":	4	Multimeter must indicate <u>8...15 V.</u>	<u>Component:</u> Auxiliary-air device, relay set
<u>Program switch position:</u>	-		<u>Operation:</u> Power supply
<u>Measuring equipment:</u> multimeter (volt range)			
<u>Measuring range:</u> 0...15 V			
<u>Connection:</u> test sockets red (positive) and black			
<u>Operation in vehicle:</u> ignition "ON" and operate starting motor			
		<u>Malfunction:</u> No reading	



Top view of connection
bases of relay set
(viewed from below)
a = Jetronic wiring harness
b = Vehicle wiring harness

Top view of multiple plug
Kl. 1 = term. 1

Trouble-shooting:

For all voltage measurements:

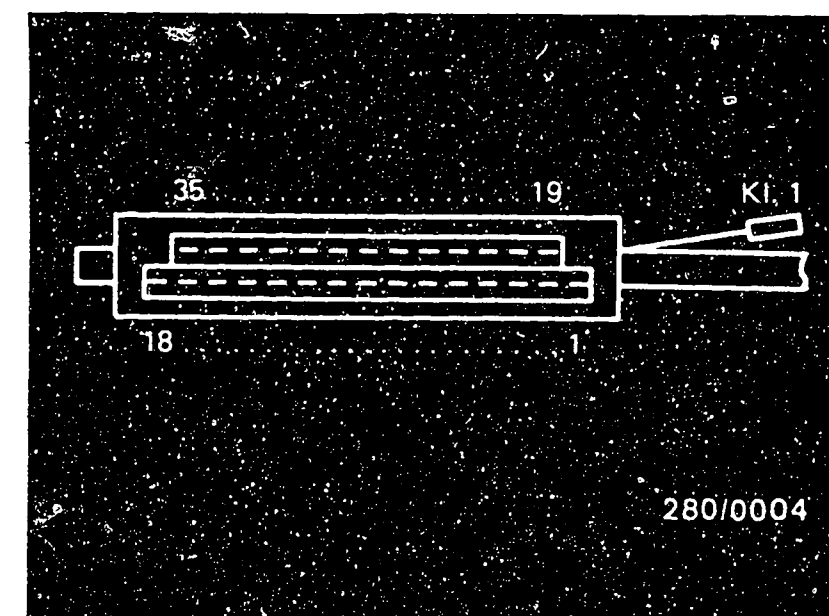
1. Set value 8...15 V (when operating starting motor)
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.
Important! Ignition "OFF" and ensure proper electrical connection when measuring.

a) Start engine; electric fuel pump operates.

1. Voltage at relay set term.88c? If no voltage, test lead 28 from relay set term.35 to multiple plug term.28 and multiple plug term.16 to central ground. If fault not eliminated, replace relay set.



B 15

Test chart for universal test adapter
BMW 745i Turbo



B 16

Test chart for universal test adapter
BMW 745i Turbo



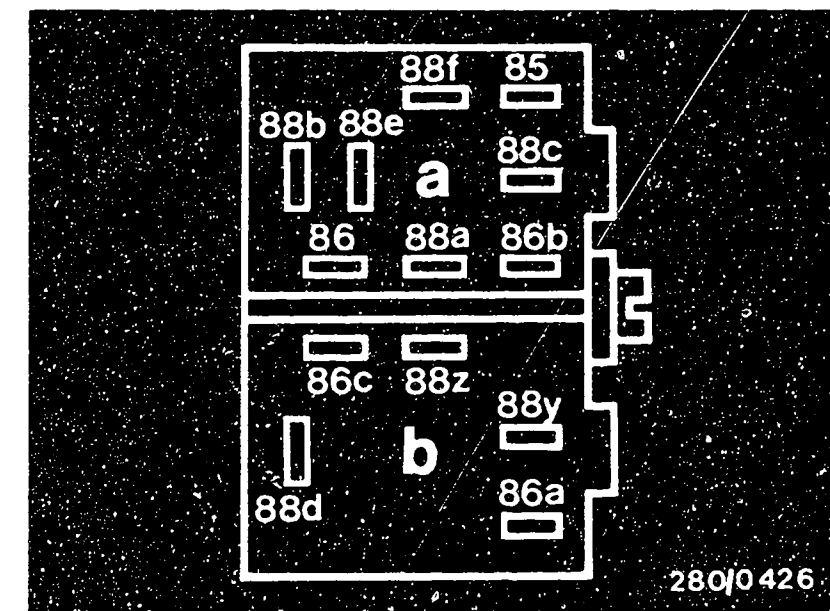
Trouble-shooting (continued)

2. Voltage at auxiliary-air device term.48? If no voltage, test lead 48 from auxiliary-air device to relay set term.38c.
 3. Test auxiliary-air device for continuity. Set value 30...65 Ω . If not, replace auxiliary-air device.
 4. Test lead 34 from auxiliary-air device to multiple plug term.34.
- b) Crank engine; electric fuel pump does not operate
1. Voltage at relay set term.88y? If no voltage, test pump fuse and power supply term.30.
 2. Voltage at relay set term.88d? If no voltage, replace relay set.
 3. Test electric fuel pump and leads (ground connection).
 4. Voltage at relay set term.88c? If no voltage, test lead 28 from relay set term.85 to multiple plug term.28 and multiple plug term.16 to central ground. If fault not eliminated, replace relay set.
 5. Voltage at auxiliary-air device term.48? If no voltage, test lead 48 from auxiliary-air device to relay set term.88c.
 6. Test auxiliary-air device for continuity. Set value 30...65 Ω . If not, replace auxiliary-air device.
 7. Test lead 34 from auxiliary-air device to multiple plug term.34.

Eliminate contact resistances at the plug-in connections.

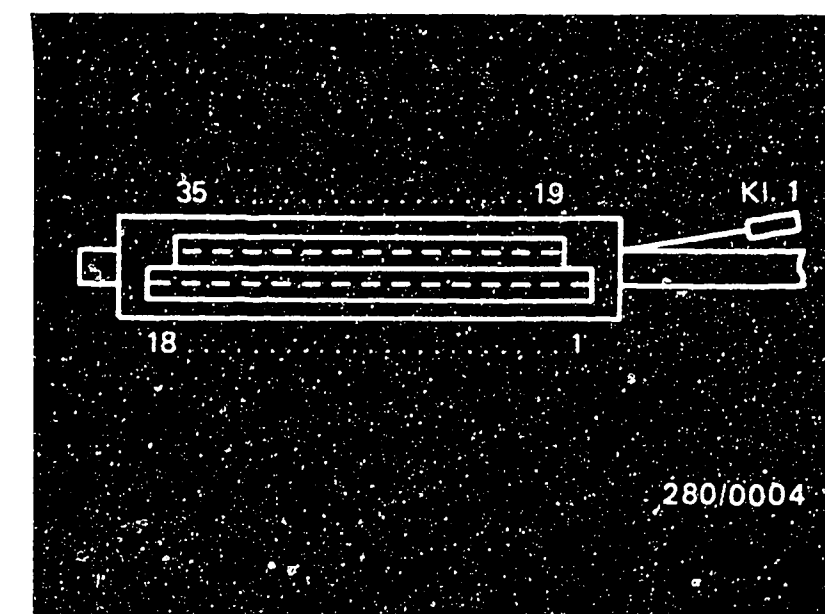
Installation position of components

Relay set:	On firewall on right-hand side.
Control unit:	Front passenger side in footwell on right-hand side behind a cover.
Auxiliary-air device:	Underneath throttle-valve assembly.
Fuel pump fuse:	In central fuse box (fuel pump)
Electric fuel pump:	Underneath vehicle on right-hand side, near rear axle.
Ground lead of electric fuel pump:	Underneath rear seat bench, on left-hand side (recess) ground point on body.



Top view of connection bases of relay set (viewed from below)
a = Jetronic wiring harness
b = vehicle wiring harness

Top view of multiple plug
Kl. 1 = term. 1



B17

Test chart for universal test adapter
BMW 745i Turbo

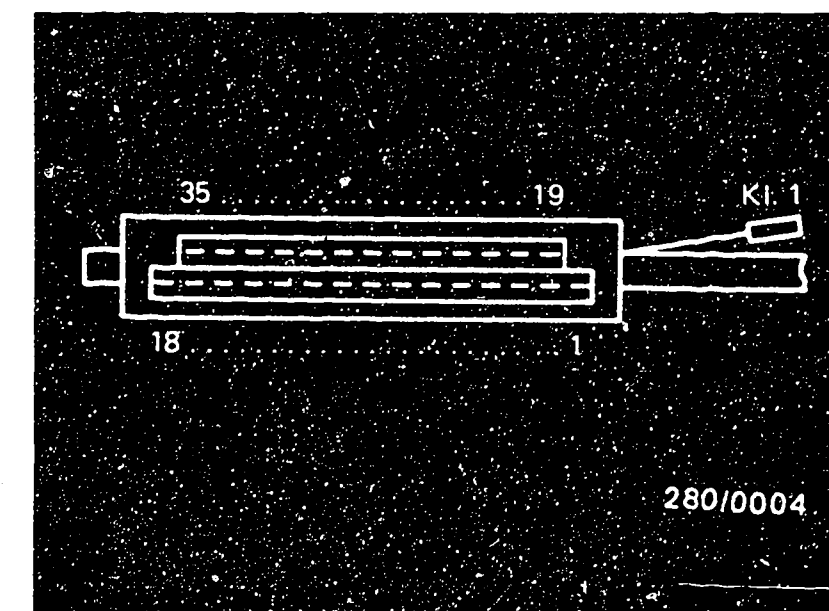


B18

Test chart for universal test adapter
BMW 745i Turbo



<u>Test step 3</u>		<u>Reading</u>	<u>Testing</u>
<u>Operation</u>			
<u>Program switch position</u> "V":	5	<u>Ignition oscilloscope</u> <u>must indicate</u> <u>ignition pulses..</u>	<u>Component:</u> Signal from term.1
<u>Program switch position:</u>	-		
<u>Measuring equipment:</u> Motortester			<u>Operation:</u>
<u>Measuring range:</u> Special input, control lever all the way to the left measuring range 20 V			Triggering of control unit by the ignition
<u>Connection:</u> Test wells			<u>Malfunction:</u> No reading
<u>Operation in vehicle:</u> Ignition "ON" and operate start- ing motor			



Top view of multiple plug
Kl. 1 = term. 1

Trouble-shooting:

For all voltage measurements:

1. Set value 8...15 V (when operating starting motor)
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

Lead from multiple plug term.1 to ignition coil term.1 dropped off?

Test and, if necessary, repair.

Voltage at ignition coil term.1? If not, check ignition system. If voltage present, test lead 1 for continuity or for short circuit to ground.

If the lead is O.K., then the trigger stage in the control unit has failed.

Replace control unit.

Installation position of components:

Control unit:

front passenger footwell,
on right-hand side behind
a cover

Central ground:

In engine compartment,
center, between 1st and 2nd
injection valves.

B19

Test chart for universal test adapter
BMW 745i Turbo



B20

Test chart for universal test adapter
BMW 745i Turbo



<u>Test step 4</u>		<u>Reading</u>	<u>Testing</u>
<u>Operation</u>			
<u>Program switch position</u> <u>"V":</u>	6	Multimeter <u>must</u> indicate <u>8...15 V.</u>	<u>Component:</u>
<u>Program switch position:</u>	-		Relay set, power supply
<u>Measuring equipment:</u> multimeter (volt range)			<u>Operation:</u>
<u>Measuring range:</u> 0...15 V			Power supply
<u>Connection:</u> test sockets red (positive) and black			<u>Malfunction:</u>
<u>Operation in vehicle:</u> ignition "ON"			No voltage reading

Trouble-shooting:

For all voltage measurements:

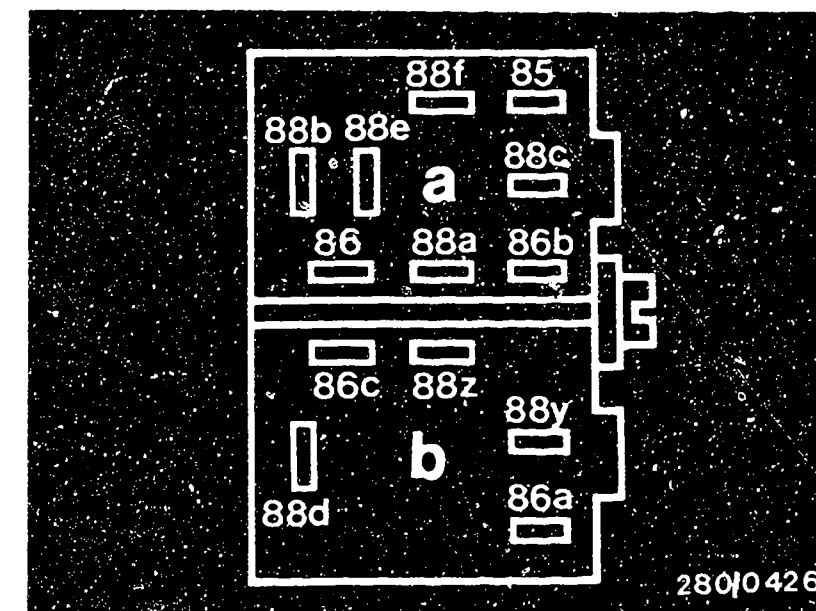
1. Set value 8...15 V (when operating starting motor)
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

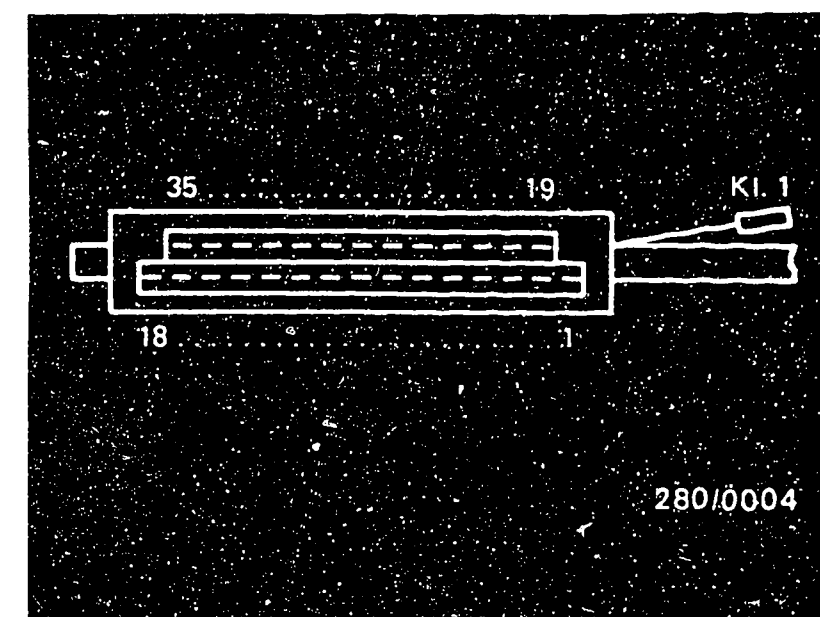
Important! Ignition "OFF" and ensure proper electrical connection when measuring.

1. Voltage at relay set term.86c? If not, check lead term.15.
 2. Voltage at relay set term.88z? If not, test lead to battery (positive terminal).
 3. Voltage at relay set term.88a? If not, replace relay set.
 4. Test lead 10 from relay set term.88a to multiple plug term.10 for continuity.
- Eliminate contact resistances at the plug-in connections.



Top view of connection bases of relay set (viewed from below)
a = Jetronic wiring harness
b = Vehicle wiring harness

Top view of multiple plug
Kl. 1 = term. 1



B21

Test chart for universal test adapter
BMW 745i Turbo



B22

Test chart for universal test adapter
BMW 745i Turbo



<u>Test step 5</u>		<u>Reading</u>	<u>Testing</u>
<u>Operation</u>			
<u>Program switch position</u> <u>"V":</u>	7	Multimeter must indicate <u>8...15 V.</u>	<u>Component:</u> Control unit relay set
<u>Program switch position:</u>	-		
<u>Measuring equipment:</u> multimeter (volt range)			<u>Operation:</u> Power supply to 1st solenoid-operated injection valve
<u>Measuring range:</u> 0...15 V			
<u>Connection:</u> test sockets red (positive) and black			<u>Malfunction:</u> No voltage reading
<u>Operation in vehicle:</u> ignition "ON"			

Trouble-shooting:

For all voltage measurements:

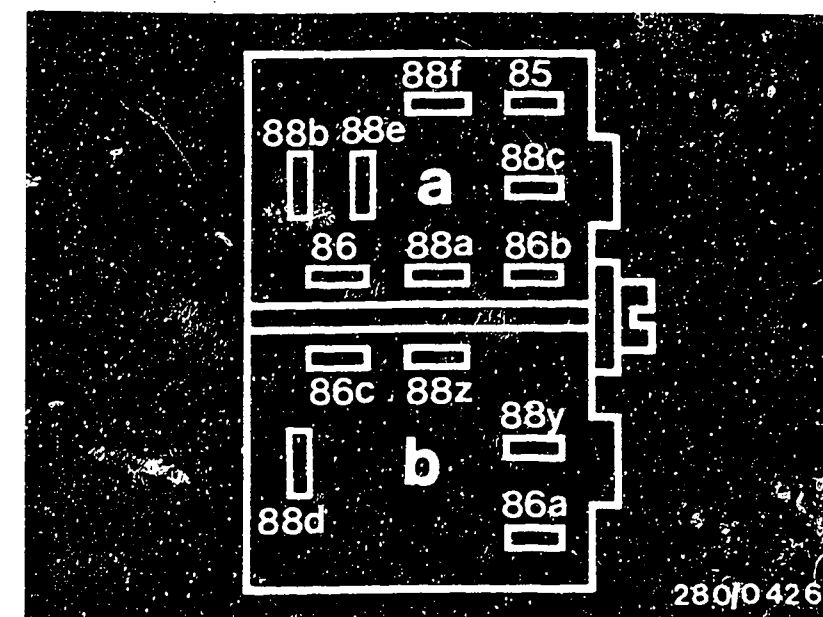
1. Set value 8...15 V (when operating starting motor)
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

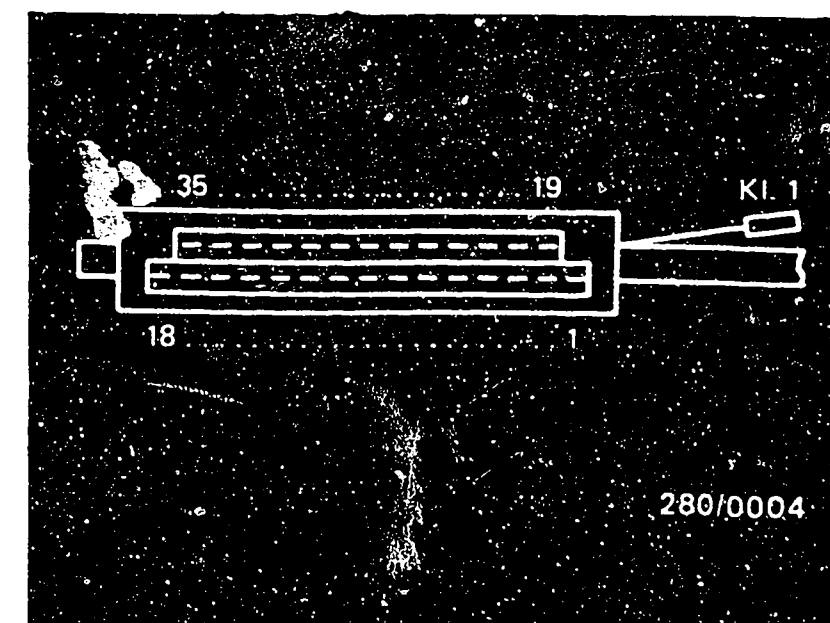
Important! Ignition "OFF" and ensure proper electrical connection when measuring.

Continued on C1/C2



Top view of connection bases of relay set (viewed from below)
a = Jetronic wiring harness
b = Vehicle wiring harness

Top view of multiple plug
Kl. 1 = term. 1



B23

Test chart for universal test adapter
BMW 745i Turbo



B24

Test chart for universal test adapter
BMW 745i Turbo



Trouble-shooting (continued)

1. Voltage at relay set term.88e? If not, replace relay set.
2. Test plug-in connection at 1st solenoid-operated injection valve. If defective, repair plug-in connection.
3. Voltage at injection valve connector term.37? If not, test lead from injection valve connector to relay set term.88e.
4. Test lead 15 from injection valve connector to multiple plug term.15 for continuity.

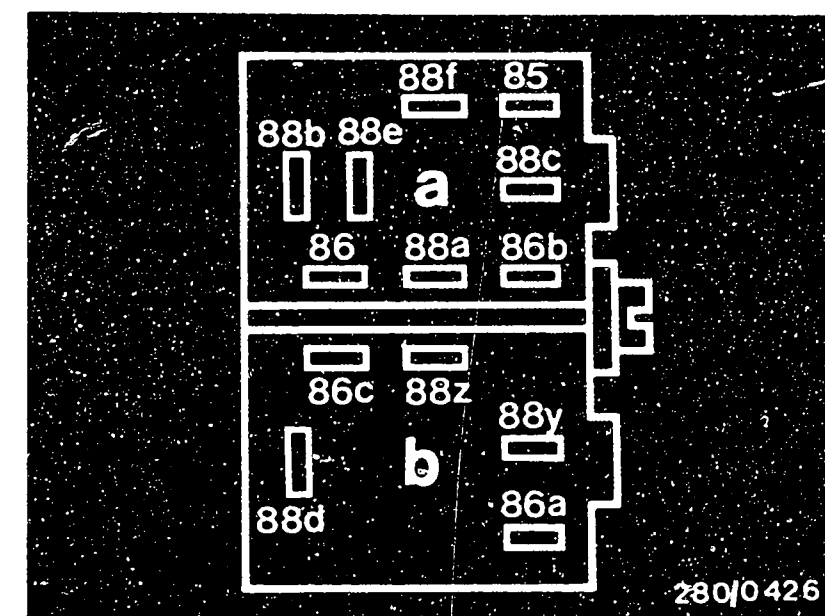
Eliminate contact resistances at the plug-in connections.

Installation position of components

Relay set: on firewall, on right-hand side.

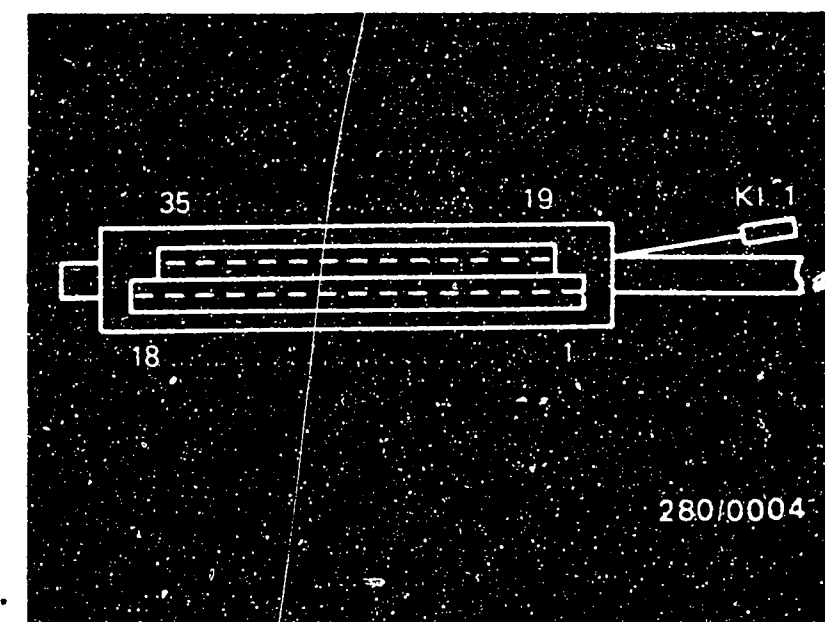
Control unit: front passenger side, in footwell on right-hand side, behind a cover.

Injection valve: between intake manifold and engine block.



Top view of connection
bases of relay set
(viewed from below)
a = Jetronic wiring harness
b = Vehicle wiring harness

Top view of multiple plug
Kl. 1 = term. 1



C1

Test chart for universal test adapter
BMW 745i Turbo

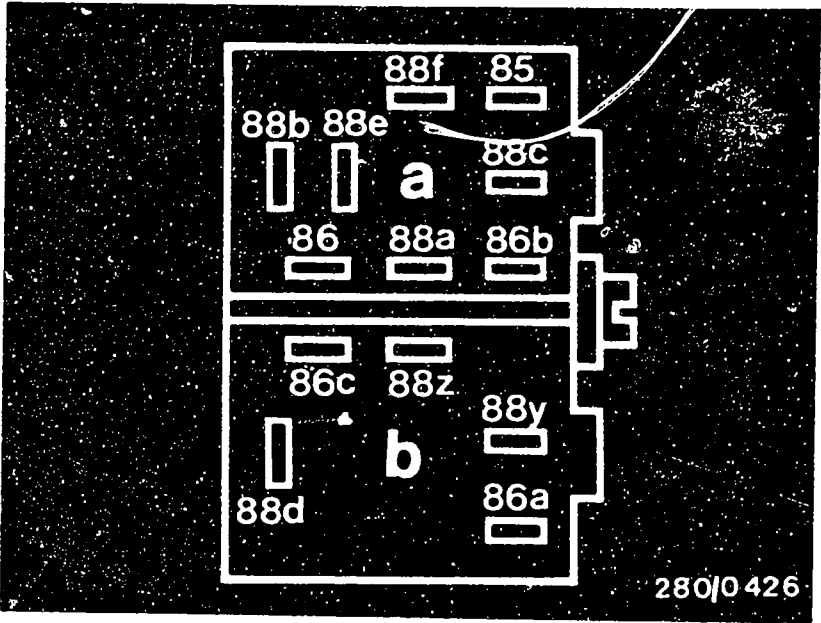


C2

Test chart for universal test adapter
BMW 745i Turbo

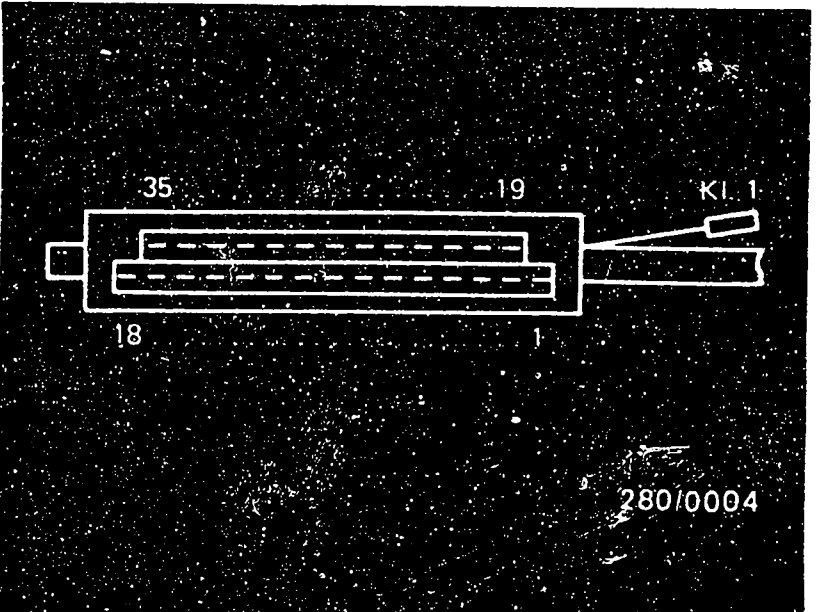


<u>Test step 6</u>		<u>Reading</u>	<u>Testing</u>
<u>Operation</u>			
<u>Program switch position</u> "V":	8	Multimeter must indicate <u>8...15 V.</u>	<u>Component:</u> Control unit relay set
<u>Program switch position:</u>	-		
<u>Measuring equipment:</u> multimeter (volt range)			
<u>Measuring range:</u> 0...15 V			
<u>Connection:</u> test sockets red (positive) and black			
<u>Operation in vehicle:</u> ignition "ON"			
			<u>Malfunction:</u> No voltage reading



Top view of connection bases of relay set (viewed from below)
a = Jetronic wiring harness
b = Vehicle wiring harness

Top view of multiple plug
Kl. 1 = term. 1



Trouble-shooting:

For all voltage measurements:

1. Set value 8...15 V (when operating starting motor)
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

Continued on C5/C6

Trouble-shooting (continued)

1. Voltage at relay set term.86e? If not, replace relay set.
2. Test plug-in connection on 2nd solenoid-operated injection valve.
If defective, repair plug-in connection.
3. Voltage at injection valve connector term.38? If not, test lead from injection valve connector to relay set term.83e.
4. Test lead 33 from injection valve connector to multiple plug term.33 for continuity.

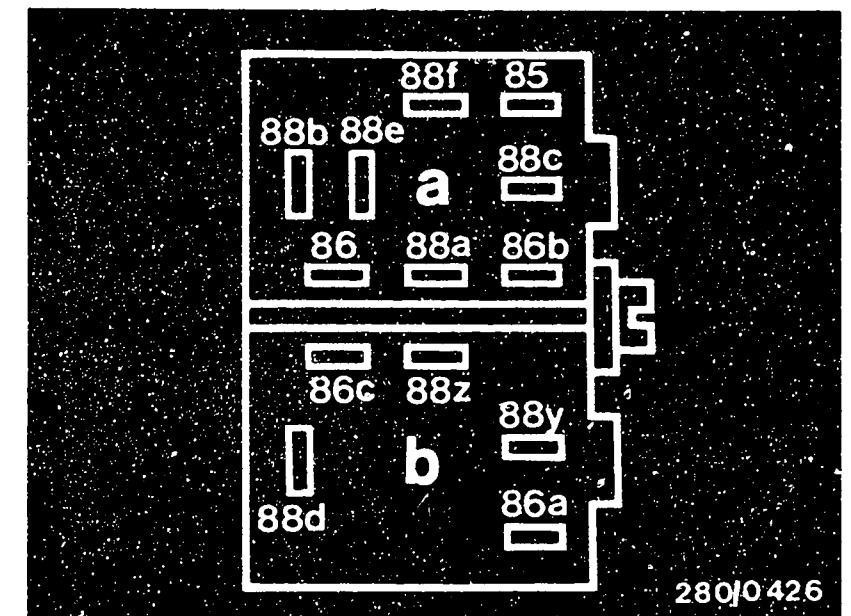
Eliminate contact resistances at the plug-in connections.

Installation position of components

Relay set: on firewall on right-hand side.

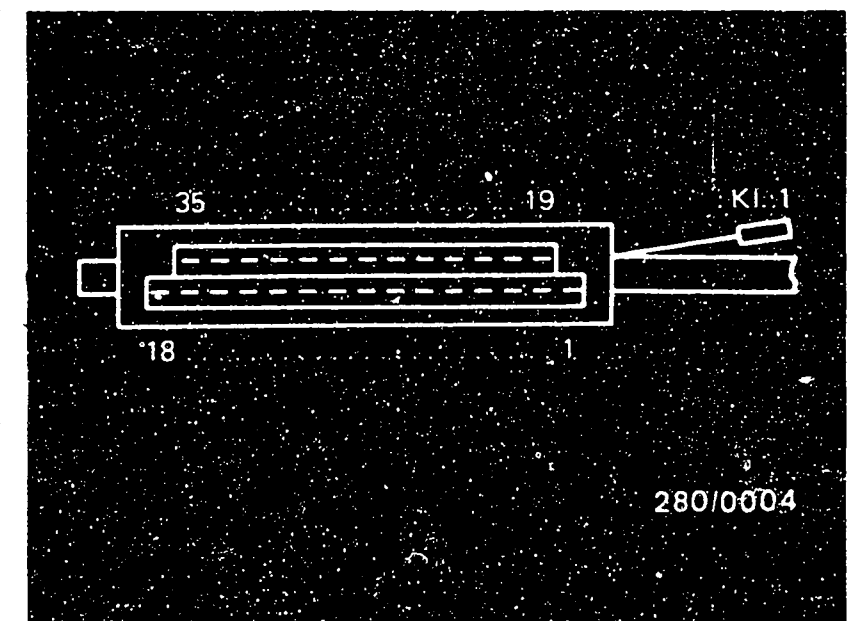
Control unit: front passenger side, in footwell on right-hand side, behind a cover.

Injection valve: between intake manifold and engine block.



Top view of connection
bases of relay set
(viewed from below)
a = Jetronic wiring harness
b = Vehicle wiring harness

Top view of multiple plug
Kl. 1 = term. 1



C5

Test chart for universal test adapter
BMW 745i Turbo



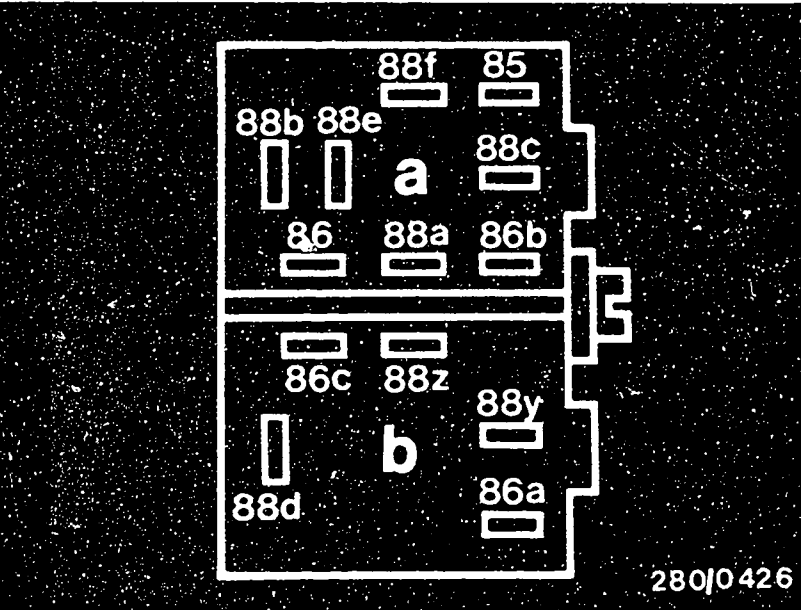
C6

Test chart for universal test adapter
BMW 745i Turbo



Test step 7

Operation		Reading	Testing
Program switch position "V":	9	Multimeter must indicate 8...15 V.	Component:
Program switch position:	-		Control unit relay set
Measuring equipment: multimeter (volt range)			Operation:
Measuring range: 0...15 V			Power supply to 3rd solenoid-operated injection valve
Connection: test sockets red (positive) and black			Malfunction:
Operation in vehicle: ignition "ON"			No voltage reading



Top view of connection bases of relay set (viewed from below)
a = Jetronic wiring harness
b = Vehicle wiring harness

Top view of multiple plug
Kl. 1 = term. 1

Trouble-shooting:

For all voltage measurements:

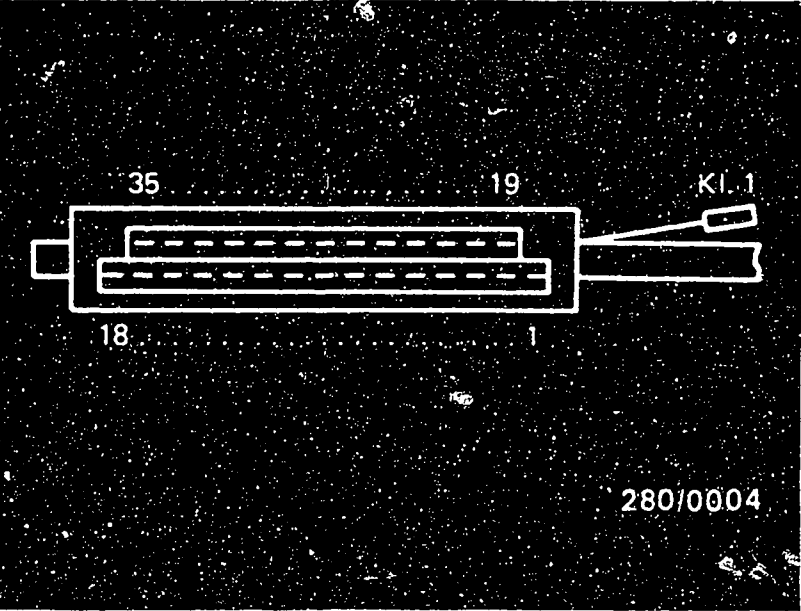
1. Set value 8...15 V (when operating starting motor)
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

Continued on C9/C10



Trouble-shooting (continued)

1. Voltage at relay set term.88e? If not, replace relay set.
2. Test plug-in connection on 3rd solenoid-operated injection valve. If defective, repair plug-in connection.
3. Voltage at injection valve connector term.40? If not, test lead from injection valve connector to relay set term.88e.
4. Test lead 32 from injection valve connector to multiple plug term.32 for continuity.

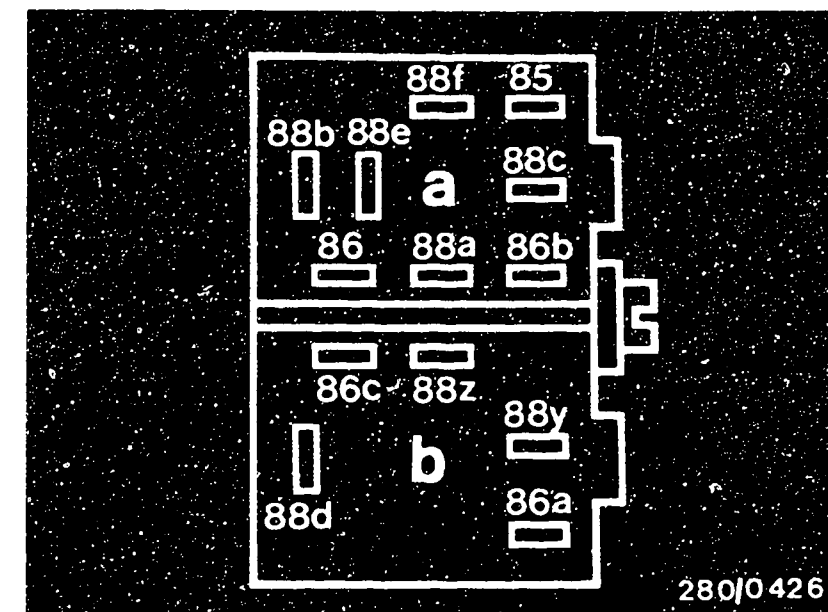
Eliminate contact resistances at the plug-in connections.

Installation position of components

Relay set: on firewall on right-hand side.

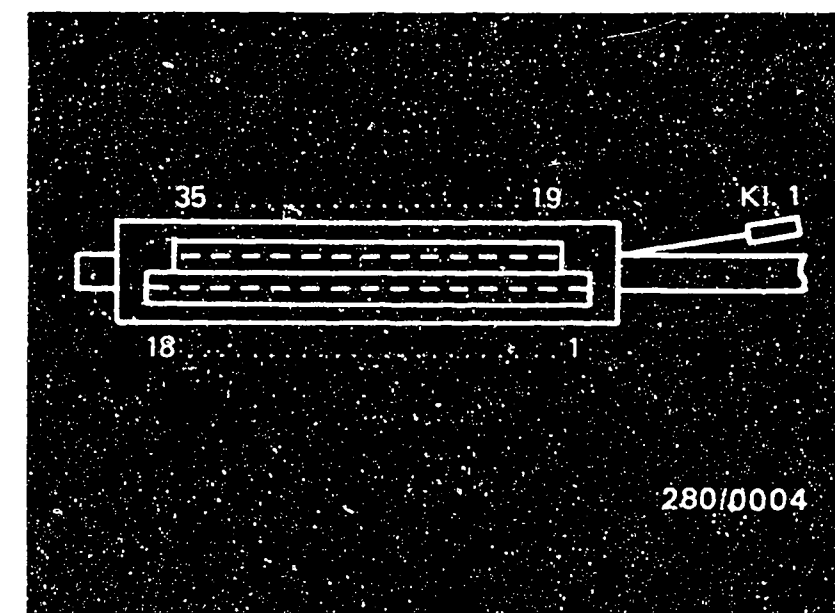
Control unit: front passenger side, in footwell on right-hand side, behind a cover.

Injection valve: between intake manifold and engine block.



Top view of connection
bases of relay set
(viewed from below)
a = Jetronic wiring harness
b = Vehicle wiring harness

Top view of multiple plug
K1. 1 = term. 1



C9

Test chart for universal test adapter
BMW 745i Turbo



C10

Test chart for universal test adapter
BMW 745i Turbo



Test step 8			
Operation		Reading	Testing
Program switch position "V":	10	Multimeter must indicate 8...15 V.	Component:
Program switch position:	-		Control unit relay set
Measuring equipment: multimeter (volt range)			Operation:
Measuring range: 0...15 V			Power supply to 4th solenoid-operated injection valve
Connection: test sockets red (positive) and black			Malfunction:
Operation in vehicle: ignition "ON"			No voltage reading

Trouble-shooting:

For all voltage measurements:

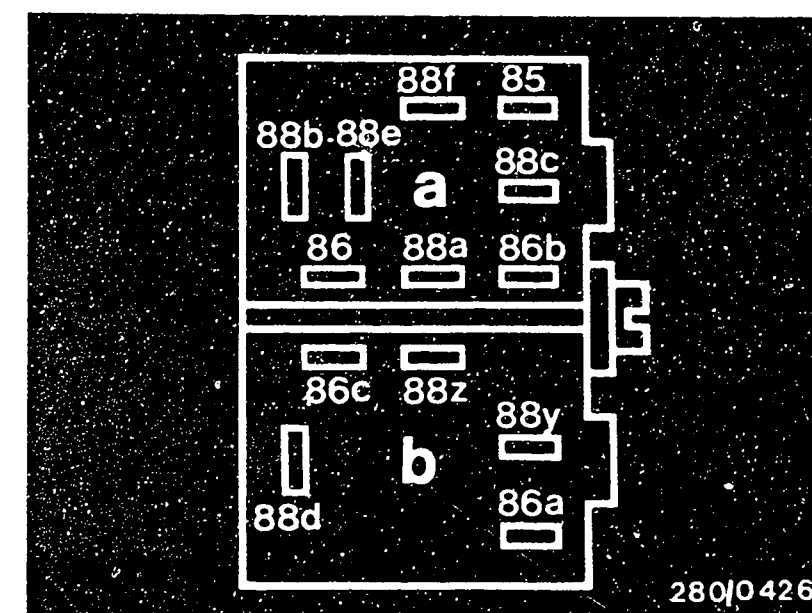
1. Set value 8...15 V (when operating starting motor)
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

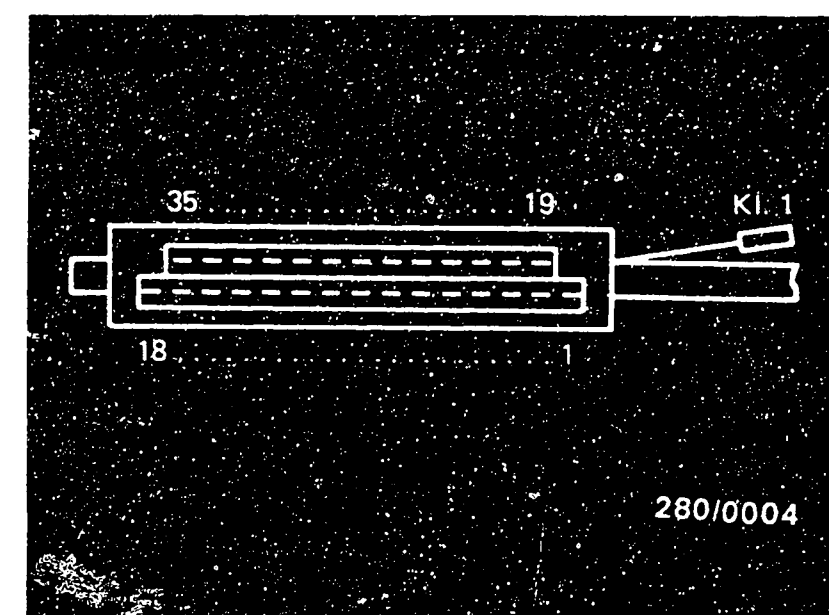
Important! Ignition "OFF" and ensure proper electrical connection when measuring.

Continued on C13/C14



Top view of connection bases of relay set (viewed from below)
a = Jetronic wiring harness
b = Vehicle wiring harness

Top view of multiple plug
Kl. 1 = term. 1



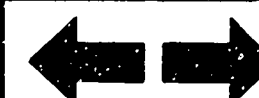
C11

Test chart for universal test adapter
BMW 745i Turbo



C12

Test chart for universal test adapter
BMW 745i Turbo



Trouble-shooting (continued)

1. Voltage at relay set term.88b? If not, replace relay set.
2. Test plug-in connection at 4th solenoid-operated injection valve. If defective, repair plug-in connection.
3. Voltage at injection valve connector term.41? If not, test lead from injection valve connector to relay set term.88b.
4. Test lead 14 from injection valve connector to multiple plug term.14 for continuity.

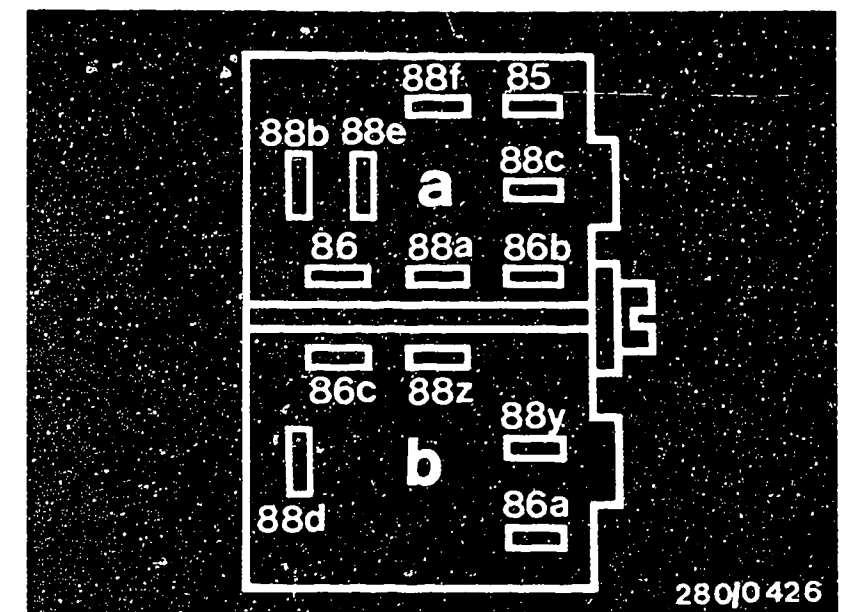
Eliminate contact resistances at the plug-in connections.

Installation position of components

Relay set: on firewall on right-hand side.

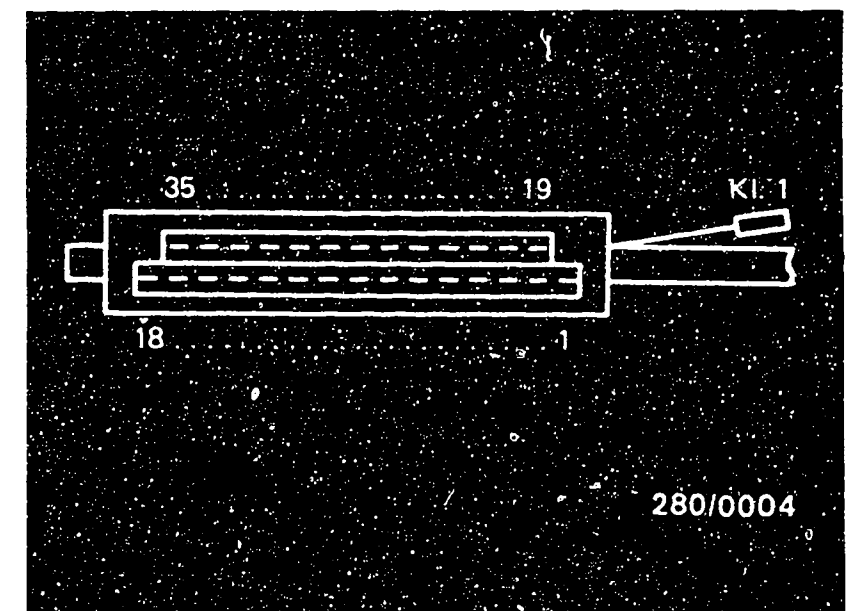
Control unit: front passenger side, in footwell on right-hand side, behind a cover.

Injection valve: between intake manifold and engine block.



Top view of connection bases of relay set (viewed from below)
a = Jetronic wiring harness
b = Vehicle wiring harness

Top view of multiple plug
Kl. 1 = term. 1



C13

Test chart for universal test adapter
BMW 745i Turbo



C14

Test chart for universal test adapter
BMW 745i Turbo



Test step 9			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch position</u> "V":	11	Multimeter must indicate <u>8...15 V.</u>	<u>Component:</u> Pump contact in air-flow sensor, relay set
<u>Program switch position:</u>	-		
<u>Measuring equipment:</u> multimeter			
<u>Measuring range:</u> 0...15 V			<u>Operation:</u> Power supply to electric fuel pump.
<u>Connection:</u> test sockets red (positive) and black			
<u>Operation in vehicle:</u> ignition "ON", deflect air-flow sensor flap			<u>Malfunction:</u> No voltage reading

Trouble-shooting:

For all voltage measurements:

1. Set value 8...15 V (then operating starting motor)
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary,
use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

Continued on C17/C18

C15

Test chart for universal test adapter
BMW 745i Turbo



C16

Test chart for universal test adapter
BMW 745i Turbo



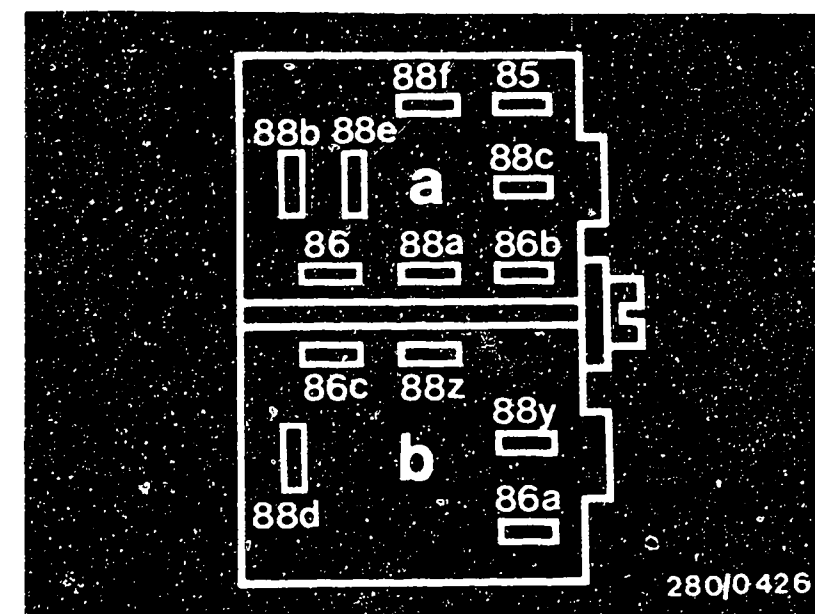
Trouble-shooting (continued)

1. Voltage at air-flow sensor term.39? If not, remove plug from air-flow sensor and test lead 39.
2. Test pump contact in air-flow sensor (deflect air-flow sensor flap). Test diode in air-flow sensor between term.5 and term.36 (positive pole of ohmmeter to term.6 of air-flow sensor) set value: approx. 0 Ω . With reversed polarity $\infty \Omega$.
3. Test lead 36 between air-flow sensor and relay set.
4. Test lead 20 between control unit and relay set.

Eliminate contact resistances in the plug-in connections.

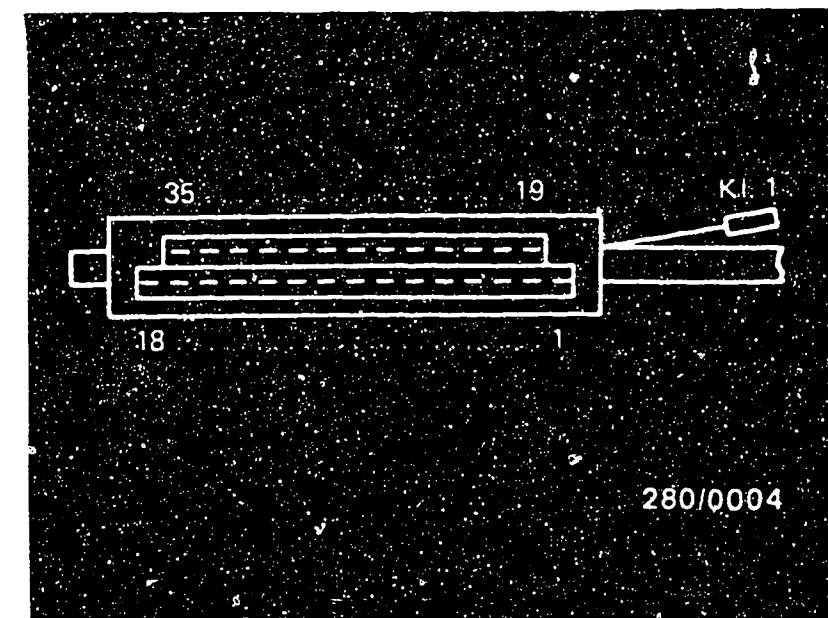
Installation position of components

Control unit: front passenger side, in footwell on right-hand side, behind a cover.
 Relay set: on firewall on right-hand side.
 Air-flow sensor: between air filter and intake manifold on right-hand side.



Top view of connection bases of relay set (viewed from below)
 a = Jetronic wiring harness
 b = Vehicle wiring harness

Top view of multiple plug
 Kl. 1 = term. 1



C17

Test chart for universal test adapter
 BMW 745i Turbo

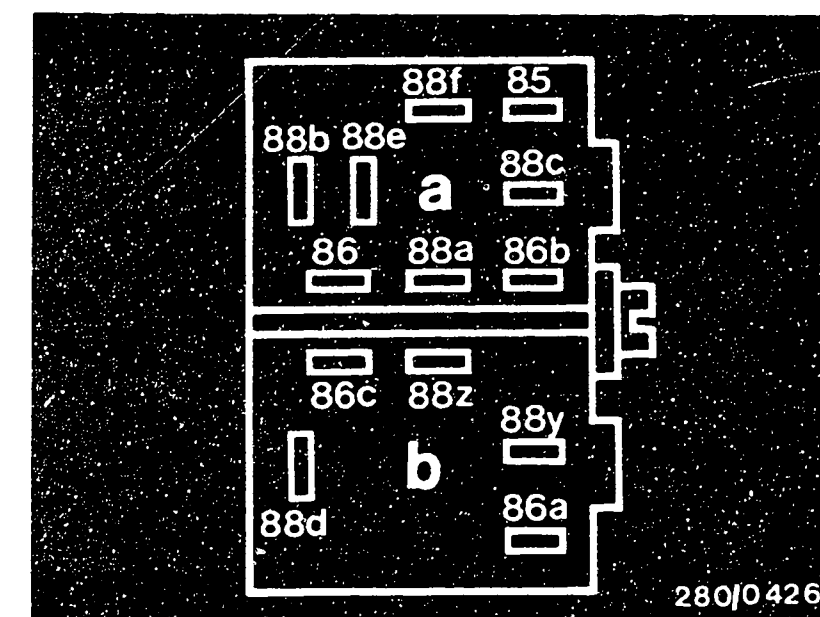


C18

Test chart for universal test adapter
 BMW 745i Turbo



Test step 10			
Operation		Reading	Testing
Program switch position "V":	12	Multimeter must indicate 8...15 V.	Component:
Program switch position:	-		Control unit
Measuring equipment: multimeter (volt range)			Operation: Triggering of control unit output stage
Measuring range: 0...15 V			
Connection: test sockets red (positive) and black			
Operation in vehicle: ignition "ON"			Malfunction: No reading



Top view of connection
bases of relay set
(viewed from below)
a = Jetronic wiring harness
b = Vehicle wiring harness

Top view of multiple plug
Kl. 1 = term. 1

Trouble-shooting:

For all voltage measurements:

1. Set value 8...15 V (when operating starting motor)
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

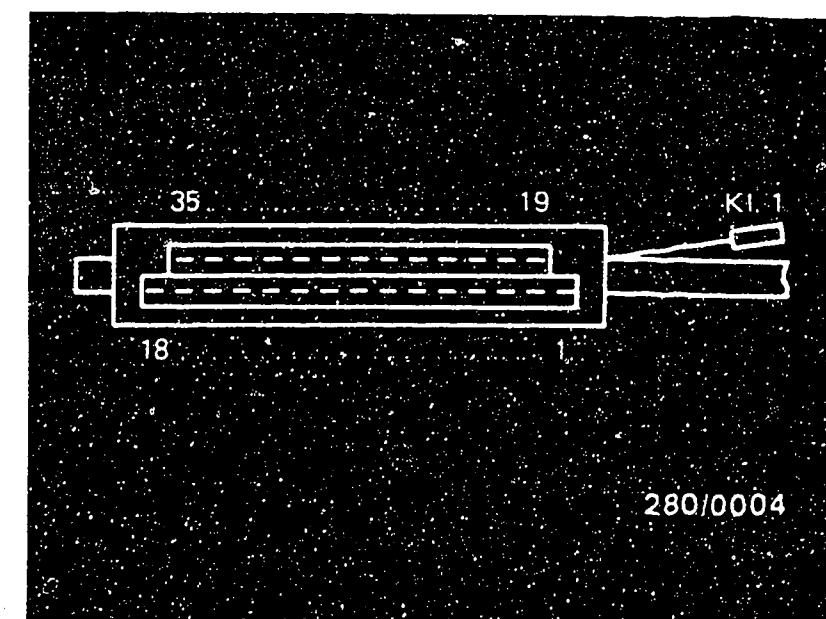
Important! Ignition "OFF" and ensure proper electrical connection when measuring. Test lead from multiple plug term.29 to relay set term.88e. If lead is O.K., but still no reading, replace the control unit.

Eliminate contact resistances at the plug-in connections.

Installation position of components:

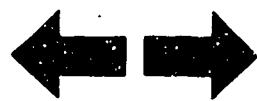
Control unit: front passenger side, in footwell on right-hand side behind a cover.

Relay set: on firewall on right-hand side.



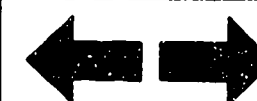
C19

Test chart for universal test adapter
BMW 745i Turbo

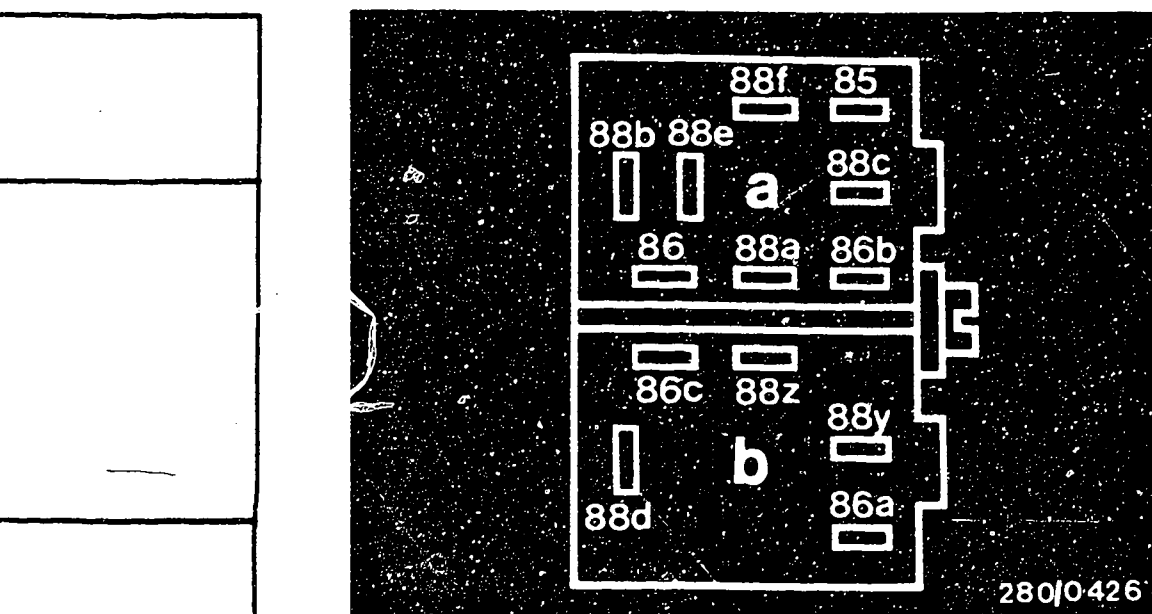


C20

Test chart for universal test adapter
BMW 745i Turbo



Test step 11			
Operation		Reading	Testing
Program switch position "V":	13	Multimeter must indicate 8...15 V.	Component:
Program switch position:	--		Control unit, relay set
Measuring equipment: multimeter (volt range)			Operation:
Measuring range:			Power supply to 5th solenoid- operated injection valve
Connection: test sockets red (positive) and black			Malfunction:
Operation in vehicle: ignition "ON"			No voltage reading



Top view of connection
bases of relay set
(viewed from below)
a = Jetronic wiring harness
b = Vehicle wiring harness

Top view of multiple plug
Kl. 1 = term. 1

Trouble-shooting:

For all voltage measurements:

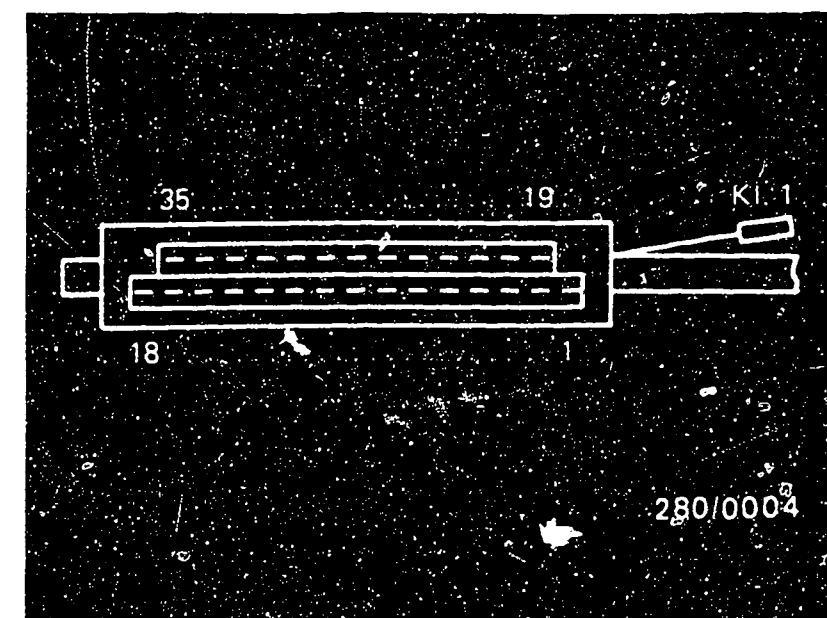
1. Set value 8...15 V (when operating starting motor)
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

Continued on C23/C24



C21

Test chart for universal test adapter
BMW 745i Turbo



C22

Test chart for universal test adapter
BMW 745i Turbo



Trouble-shooting (continued)

1. Voltage at relay set term.88b? If not, replace relay set.
2. Test plug-in connection on 5th solenoid-operated injection valve. If defective, repair plug-in connection.
3. Voltage at injection valve connector term.55? If not, test lead from injection valve connector to relay set term.88b.
4. Test lead 30 from injection valve connector to multiple plug term.30 for continuity.

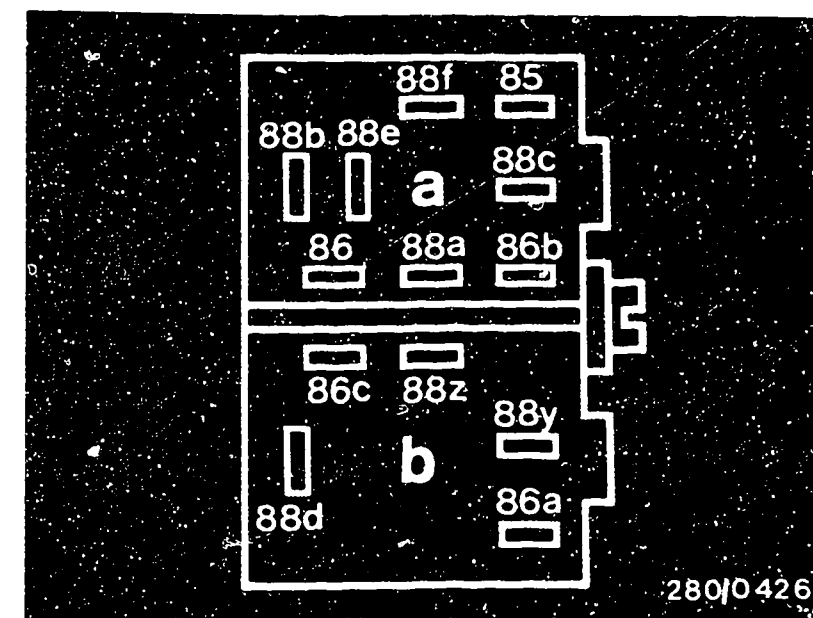
Eliminate contact resistances at the plug-in connections.

Installation position of components

Relay set: on firewall on right-hand side.

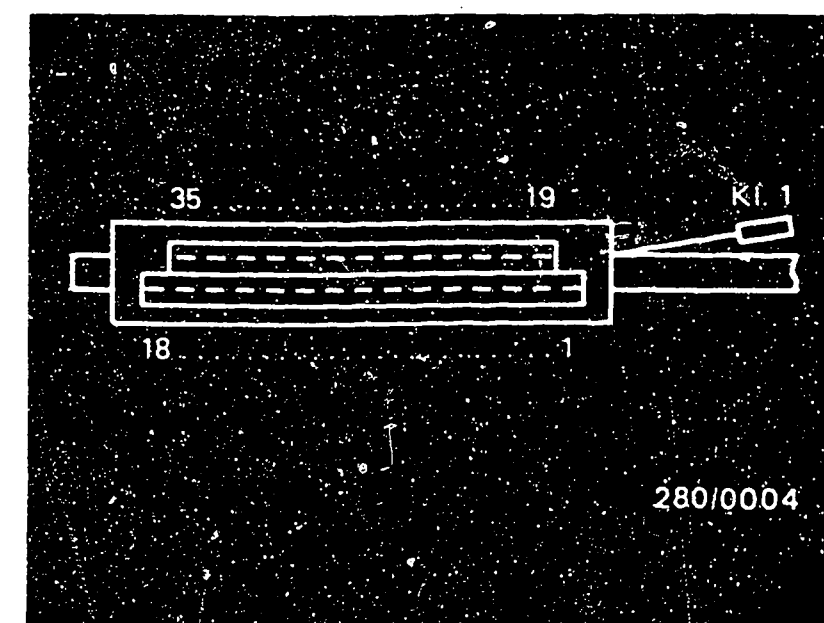
Control unit: front passenger side, in footwell on right-hand side behind a cover.

Injection valve: between intake manifold and engine block.



Top view of connection
bases of relay set
(viewed from below)
a = Jetronic wiring harness
b = Vehicle wiring harness

Top view of multiple plug
Kl. 1 = term.



C23

Test chart for universal test adapter
BMW 745i Turbo



C24

Test chart for universal test adapter
BMW 745i Turbo



Test step 12

Operation

Program switch position
"V":

14

Program switch position:

-

Measuring equipment:
multimeter
(volt range)

Measuring range:
0...15 V

Connection:
test sockets red
(positive) and black

Operation in vehicle:
ignition "ON"

Reading

Multimeter must
indicate

8...15 V.

Testing

Component:

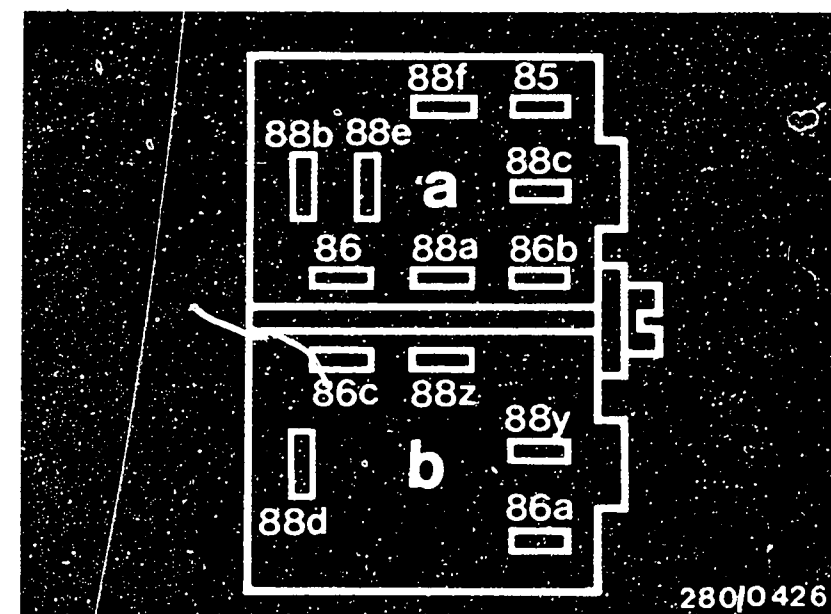
Control unit;
relay set

Operation:

Power supply to 6th solenoid-
operated injection valve

Malfunction:

No voltage reading



Top view of connection
bases of relay set
(viewed from below)
a = Jetronic wiring harness
b = Vehicle wiring harness

Top view of multiple plug
Kl. 1 = term. 1

Trouble-shooting:

For all voltage measurements:

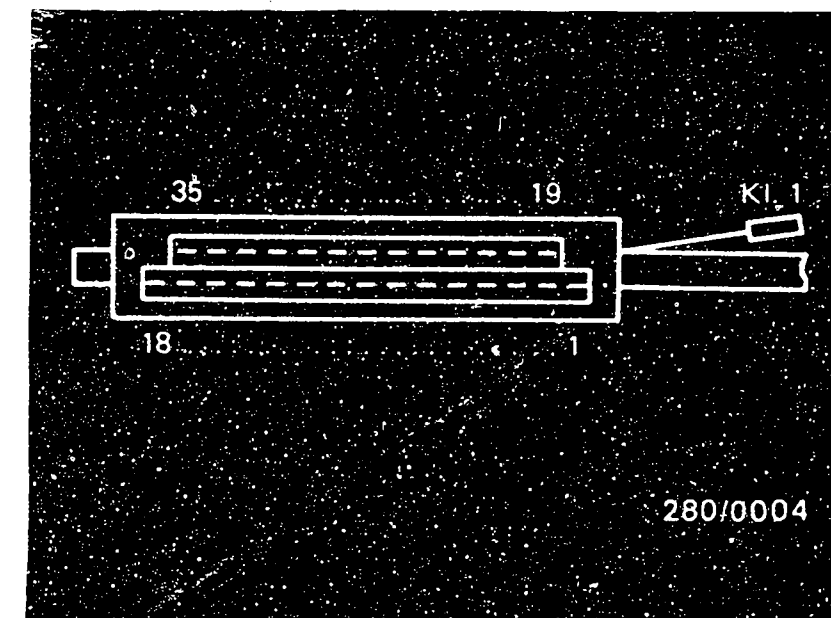
1. Set value 8...15 V (when operating starting motor)
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary,
use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

Continued on D3/D4



D1

Test chart for universal test adapter
BMW 745i Turbo



D2

Test chart for universal test adapter
BMW 745i Turbo



Trouble-shooting (continued)

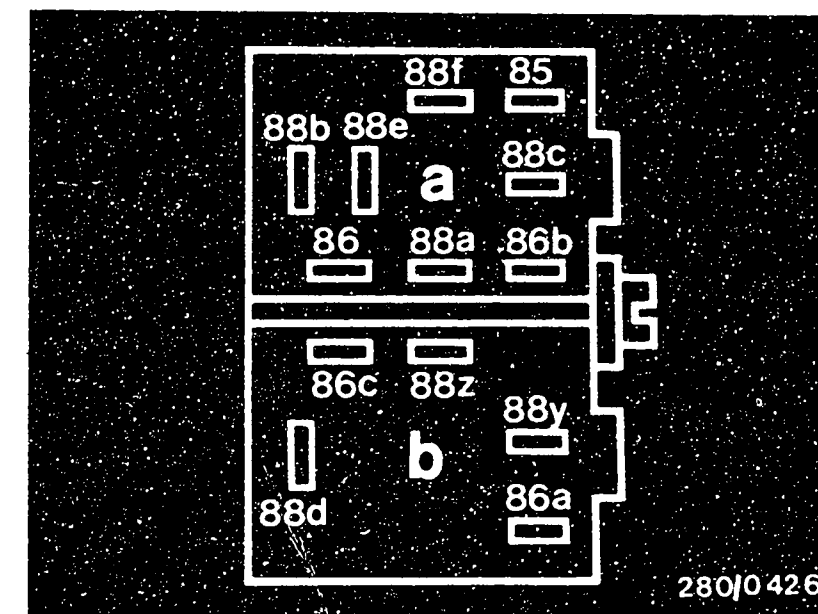
1. Voltage at relay set term.88b? If not, replace relay set.
 2. Test plug-in connection on 6th solenoid-operated injection valve. If defective, repair plug-in connection.
 3. Voltage at injection valve connector term.56? If not, test lead from injection valve connector to relay set term.88b.
 4. Test lead 31 from injection valve connector to multiple plug term.31 for continuity.
- Eliminate contact resistances at the plug-in connections.

Installation position of components

Relay set: on firewall on right-hand side.

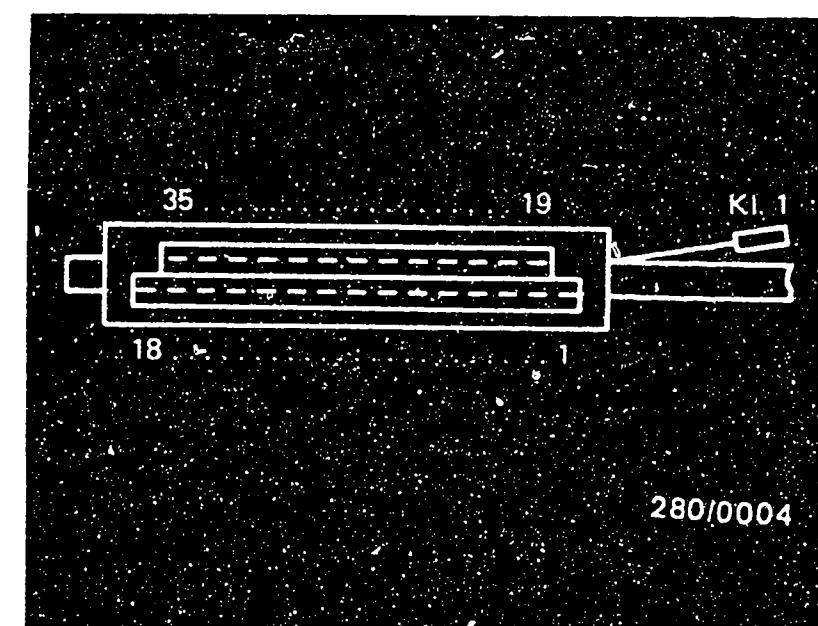
Control unit: front passenger side, in footwell on right-hand side behind a cover.

Injection valve: between intake manifold and engine block.



Top view of connection bases of relay set (viewed from below)
a = Jetronic wiring harness
b = Vehicle wiring harness

Top view of multiple plug
Kl. 1 = term. 1



D3


Test chart for universal test adapter
BMW 745i Turbo

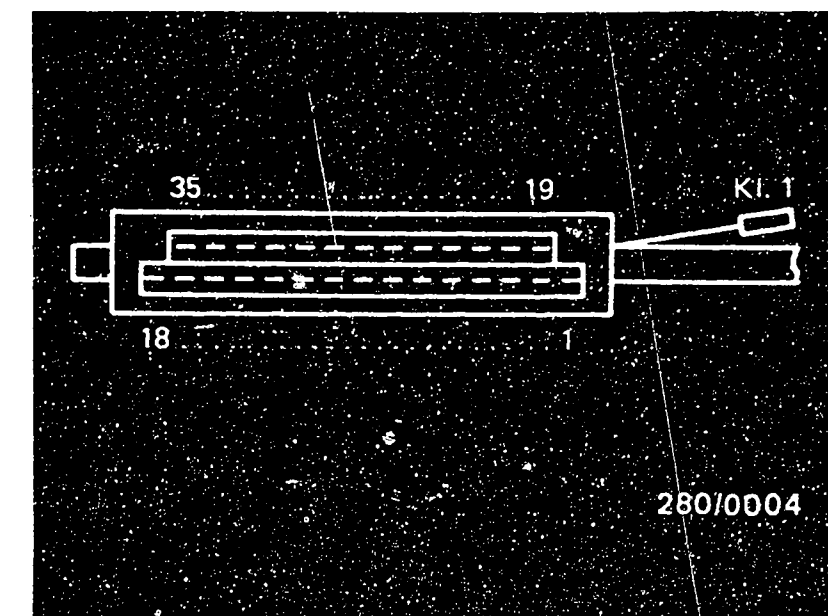


D4

Test chart for universal test adapter
BMW 745i Turbo



Test step 13			
Operation		Reading	Testing
<u>Program switch position</u> "V":		Multimeter must indicate <u>60...1000 Ω.</u>	<u>Component:</u> Air-flow sensor (potentiometer)
<u>Program switch position:</u>	6		
<u>Measuring equipment:</u> multimeter (Ω range)			
<u>Measuring range:</u> X 10 Ω			
<u>Connection:</u> test sockets blue			
<u>Operation in vehicle:</u> deflect air-flow sensor flap			<u>Malfunction:</u> Resistance outside tolerance



Top view of multiple plug
Kl. 1 = term. 1

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical contact when measuring.

From multiple plug term.7 to air-flow sensor term.7.

From air-flow sensor term.6 to multiple plug term.6.

From multiple plug term.5 to central ground.

Eliminate contact resistances in the plug-in connections.

Installation position of components:

Control unit: front passenger side, footwell on right-hand side behind a cover.

Air-flow sensor: on right-hand side, in engine compartment between air filter and intake manifold.

Central ground: between 5th and 6th solenoid-operated injection valves.

D5

Test chart for universal test adapter
BMW 745i Turbo



D6

Test chart for universal test adapter
BMW 745i Turbo



Test step 14			
Operation		Reading	Testing
Program switch position "V":	↓	Multimeter must indicate 260...520 Ω .	Component:
Program switch position:	7		Air-flow sensor
Measuring equipment: multimeter (Ω range)			Operation:
Measuring range: X 10 Ω			Resistance between air-flow sensor term.8 and central ground
Connection: test sockets blue			Malfunction:
Operation in vehicle:	-----		Resistance outside tolerance

Trouble shooting:

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical contact when measuring.

From multiple plug term.8 to air-flow sensor term.8.

From air-flow sensor term.6 to multiple plug term.6.

From multiple plug term.5 to central ground.

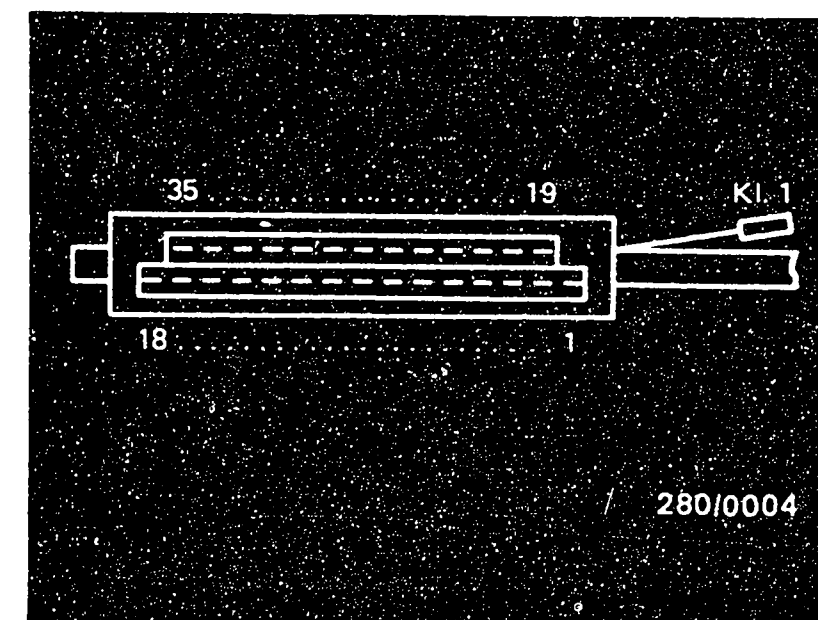
Eliminate contact resistances in the plug-in connections.

Installation position of components:

Control unit: front passenger side, footwell on right-hand side behind a cover.

Air-flow sensor: on right-hand side, in engine compartment between air filter and intake manifold.

Central ground: between 5th and 6th solenoid-operated injection valves.



Top view of multiple plug
KL. 1 = term. 1

D7

Test chart for universal test adapter

BMW 745i Turbo




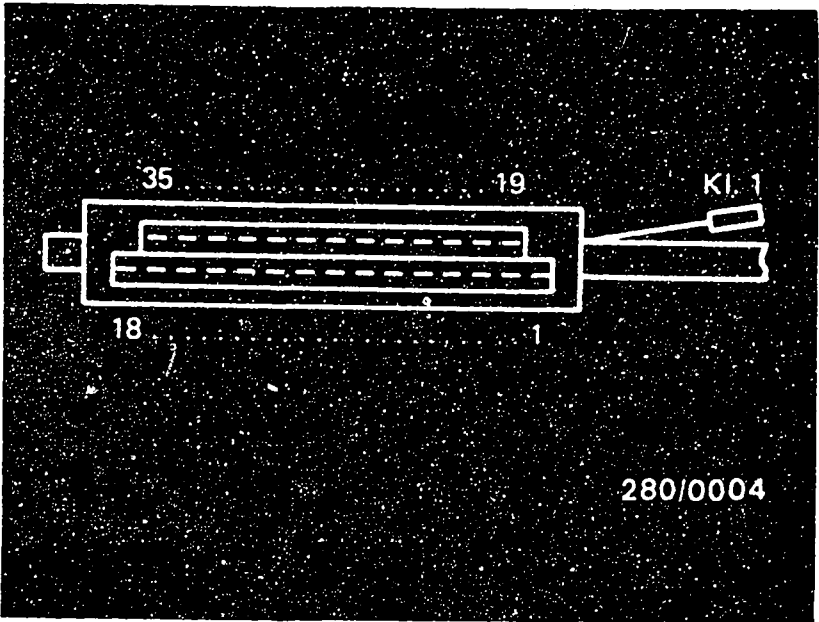
D8

Test chart for universal test adapter

BMW 745i Turbo



Test step 15		
Operation	Reading	Testing
Program switch position "V": 	Multimeter must indicate 400...800 Ω .	Component: Air-flow sensor
Program switch position: 8		
Measuring equipment: multimeter (Ω range)		Operation: Resistance between air-flow sensor term.9 and central ground.
Measuring range: X 10 Ω		
Connection: test sockets blue		Malfunction: Resistance outside tolerance
Operation in vehicle: -----		



Top view of multiple plug
Kl. 1 = term. 1

Trouble shooting:

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical contact when measuring.

From multiple plug term.9 to air-flow sensor term.9.

From air-flow sensor term.6 to multiple plug term.6.

From multiple plug term.5 to central ground.


Eliminate contact resistances in the plug-in connections.

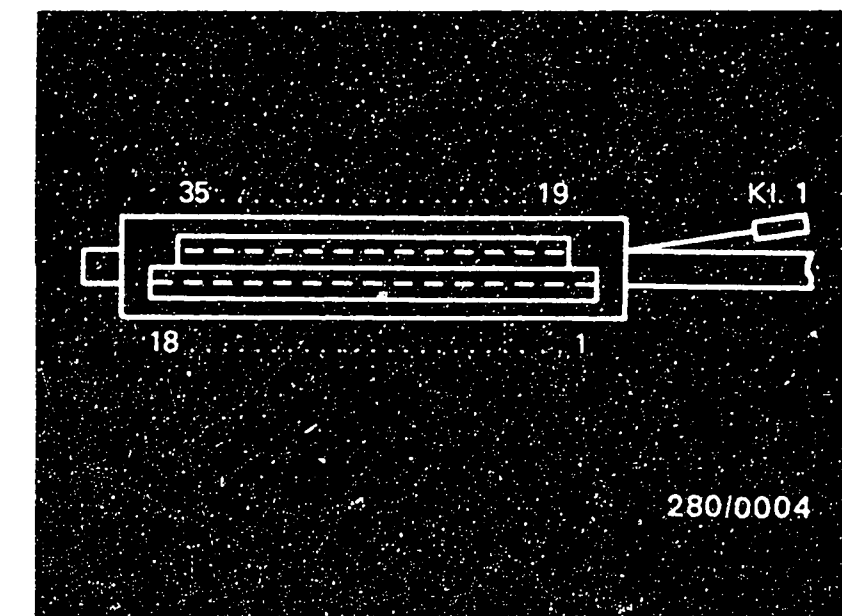
Installation position of components:

Control unit: front passenger side, footwell on right-hand side behind a cover.

Air-flow sensor: on right-hand side, in engine compartment between air filter and intake manifold.

Central ground: between 5th and 6th solenoid-operated injection valves.

Test step 16		Reading	Testing
Operation			
Program switch position "V"		Multimeter must indicate <u>0...10 Ω</u>	<u>Component:</u> Throttle-valve switch (idle contact)
Program switch position:	9		
<u>Measuring equipment:</u> multimeter (Ω range)			<u>Operation:</u> Resistance at throttle-valve switch between term.2 and term.18
<u>Measuring range:</u> X 1 Ω			
<u>Connection:</u> test sockets blue			<u>Malfunction:</u> Resistance outside tolerance
<u>Operation in vehicle:</u> accelerator in rest position			



Top view of multiple plug
Kl. 1 = term. 1

Installation position of components
Throttle-valve switch:
Transverse to the direction of travel,
on the throttle-valve assembly.

Control unit:
Front passenger side, in footwell on
right-hand side behind a cover.

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical contact when measuring.

From multiple plug term.2 to throttle-valve switch term.2.

From throttle-valve switch term.18 to multiple plug term.18.

Eliminate contact resistances in the plug-in connections.

Adjusting the throttle-valve switch:

Loosen the fastening screws of the throttle-valve switch slightly.

Connect ohm meter to throttle-valve switch between term.2 and term.18.

Turn the throttle-valve switch to the right until the idle contact (microswitch) can be heard to click (reading 0 Ω).

Checking the adjustment: Pull on the throttle cable slightly (open throttle valve slightly). The idle contact must be heard to click (reading $\infty \Omega$).

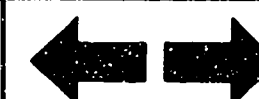
D11

Test chart for universal test adapter
BMW 745i Turbo

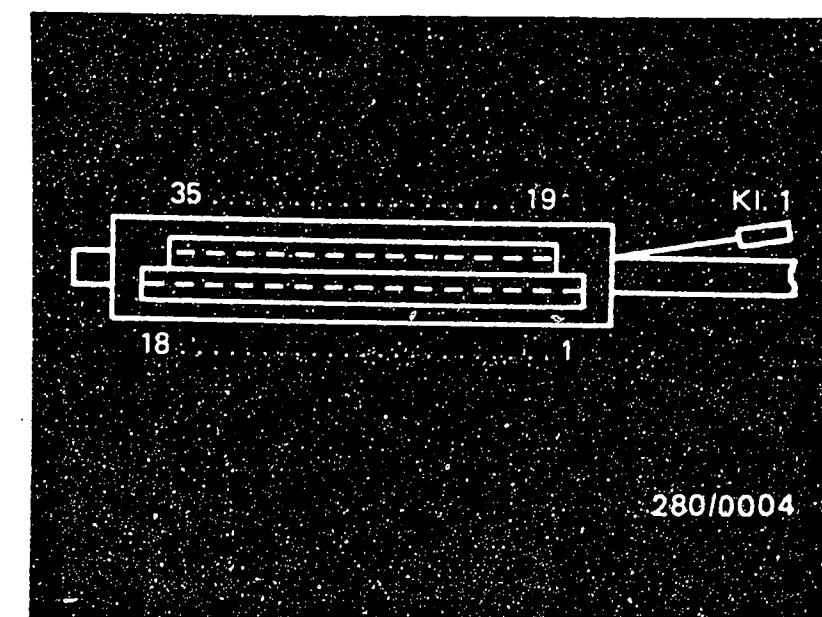


D12

Test chart for universal test adapter
BMW 745i Turbo



Test step 17		
Operation	Reading	Testing
Program switch position "V": ↓	Multimeter must indicate <u>0...10 Ω .</u>	<u>Component:</u> Throttle-valve switch (full-load contact)
Program switch position: 10		
Measuring equipment: multimeter (Ω range)		
Measuring range: X 1 Ω		
Connection: test sockets blue		
Operation in vehicle: accelerator in full-load position		<u>Operation:</u> Resistance at throttle-valve switch between term.3 and term.18 <u>Malfunction:</u> Resistance outside tolerance



Top view of multiple plug
Kl. 1 = term. 1

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical contact when measuring.

From multiple plug term.3 to throttle-valve switch term.3.

From throttle-valve switch term.18 to multiple plug term.18.

Eliminate contact resistances in the plug-in connections.

Installation position of components:

Throttle-valve switch: transverse to the direction of travel, on the throttle-valve assembly.

Control unit: front passenger side, in footwell on right-hand side behind a cover.

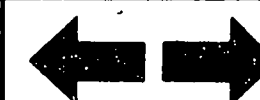
D 13

Test chart for universal test adapter
BMW 745i Turbo



D 14

Test chart for universal test adapter
BMW 745i Turbo



Test step 18			
Operation		Reading	Testing
Program switch position "V":	↓	Multimeter must indicate <u>30 Ω ...30 k Ω</u> (depends on temperature.)	<u>Component:</u> Temperature sensor I (intake air)
Program switch position:	11		
<u>Measuring equipment:</u> multimeter (Ω range)			<u>Operation:</u> Resistance at air-flow sensor between term.27 and term.6
<u>Measuring range:</u> X 10 or 100 Ω			
<u>Connection:</u> test sockets blue			
<u>Operation in vehicle:</u> -----			

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. $0\ \Omega$.

Important! Ignition "OFF" and ensure proper electrical contact when measuring.

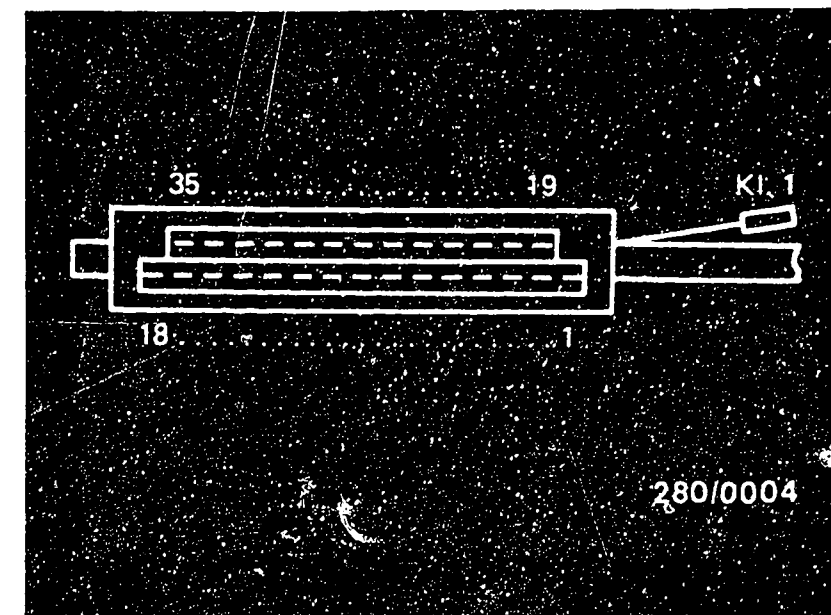
Measure resistance directly at temperature sensor I (intake air) in air-flow sensor.
 at ambient temperature (approx. $+15\dots+30^{\circ}\text{C}$): $1.45\dots3.3\ k\ \Omega$
 with engine at normal op.temp. (approx. $+80^{\circ}\text{C}$): $280\dots360\ \Omega$

From multiple plug term.27 to air-flow sensor term.27.

From air-flow sensor term.6 to multiple plug term.6.

From multiple plug term.5 to central ground.

Eliminate contact resistances in the plug-in connections.



Top view of multiple plug
K1.1 = term. 1

Installation position of components:

Control unit:

Front passenger side in footwell on right-hand side behind a cover.

Air-flow sensor:

On right-hand side in engine compartment between air filter and intake manifold.

Central ground:

Between 5th and 6th injection valves.

D 15

Test chart for universal test adapter
BMW 745i Turbo



D 16

Test chart for universal test adapter
BMW 745i Turbo



Test step 19		
Operation	Reading	Testing
Program switch position "V": ↓	Multimeter must indicate $30\ \Omega \dots 30\ k\ \Omega$ (depends on temperature.)	Component: Temperature sensor II (engine)
Program switch position: 12		
Measuring equipment: multimeter (Ω range)		Operation: Resistance between control unit term.10 and central ground
Measuring range: $\times 10$ or $\times 100\ \Omega$		
Connection: test sockets blue		Malfunction: Resistance outside tolerance
Operation in vehicle: -----		

Trouble-shooting:

For resistance measurements:

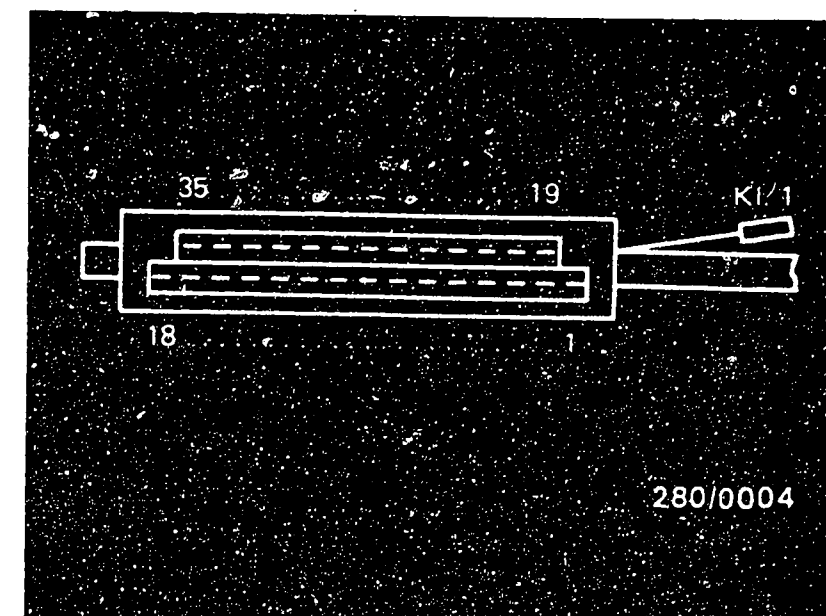
For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. $0\ \Omega$.

Important! Ignition "OFF" and ensure proper electrical contact when measuring.

1. Measure resistance directly at temperature sensor II (engine) (white plug):
at ambient temperature (approx. $+15 - +30^{\circ}\text{C}$): $1.3\dots 3.6\ k\ \Omega$
with engine at normal op.temp. (approx. $+80^{\circ}\text{C}$): $250\dots 390\ \Omega$

2. From multiple plug term.10 to temperature sensor II (engine) term.10.
Lead 38 from temperature sensor II to central ground.

Eliminate contact resistances in the plug-in connections.



Top view of multiple plug
K1.1 = term. 1

Installation position of components:

Control unit:

Front passenger side, in footwell on right-hand side, behind a cover.

Temperature sensor II:

In engine compartment, in cooling water system, at front on engine block.

Central ground:

In engine compartment, center, between 5th and 6th injection valves.

D17

Test chart for universal test adapter
BMW 745i Turbo




D18

Test chart for universal test adapter
BMW 745i Turbo



Test step 20

Operation		Reading	Testing
<u>Program switch position "V":</u>		Multimeter must indicate <u>0...10 Ω.</u>	<u>Component:</u> Ground connection of output stage
<u>Program switch position:</u>	13		<u>Operation:</u> Ground connection of control unit
<u>Measuring equipment:</u> multimeter (Ω range)			
<u>Measuring range:</u> X 1 Ω			
<u>Connection:</u> test sockets blue			<u>Malfunction:</u> Resistance outside tolerance
<u>Operation in vehicle:</u> -----			

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary; use circuit diagram. Set value approx. 0Ω .

Important! Ignition "OFF" and ensure proper electrical contact when measuring.

From multiple plug term.16 to central ground.

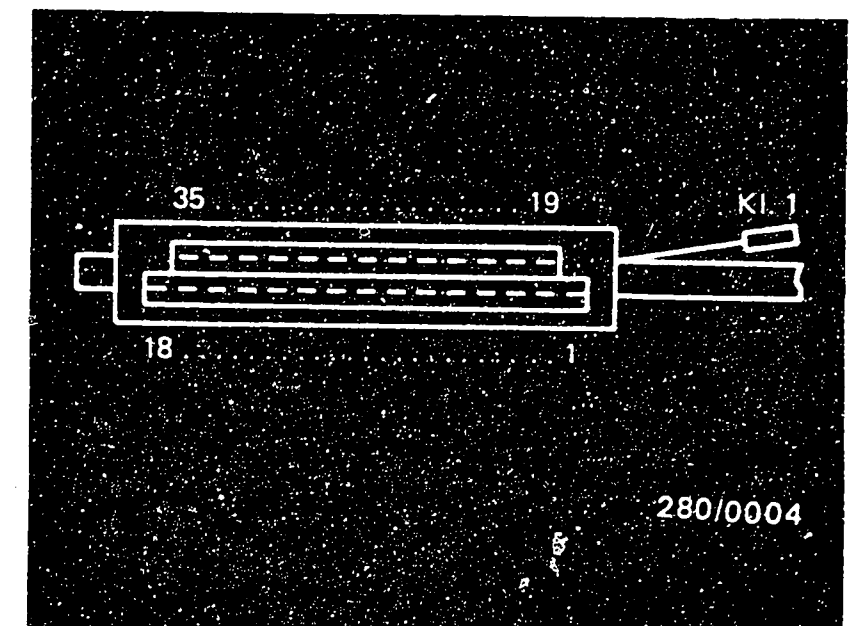
From multiple plug term. 5 to central ground.

Eliminate contact resistances at the plug-in connections.

Installation position of components:

Control unit: front passenger side in footwell on right-hand side behind a cover.

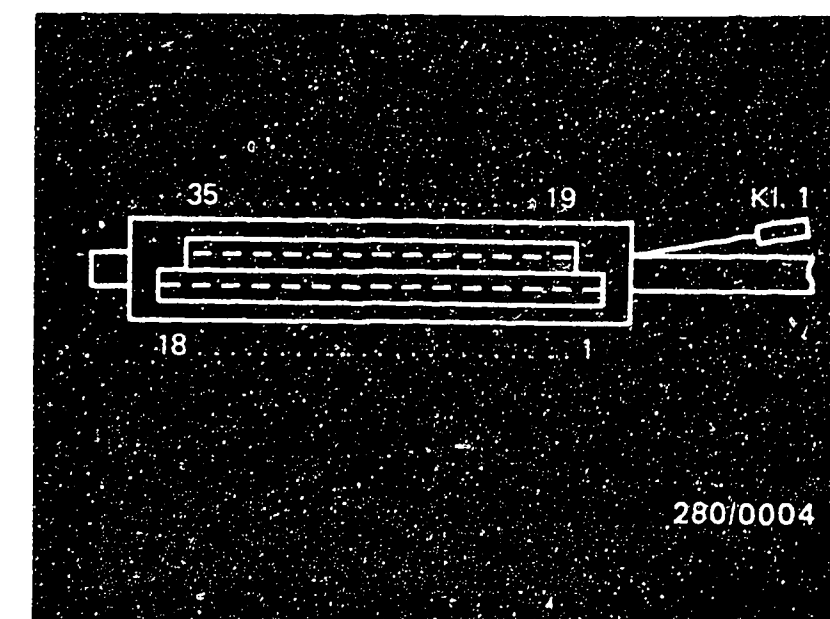
Central ground: in engine compartment, center, between 5th and 6th injection valves.



Top view of multiple plug
K1. 1 = term. 1



Test step 21		Reading	Testing
Operation			
<u>Program switch position "V":</u>	↓	Multimeter must indicate <u>0...10 Ω .</u>	<u>Component:</u> Ground connection of output stage
<u>Program switch position:</u>	14		
<u>Measuring equipment:</u> multimeter (Ω range)			<u>Operation:</u> Ground connection of control unit
<u>Measuring range:</u> X 1 Ω			
<u>Connection:</u> test sockets blue			<u>Malfunction:</u> Resistance outside tolerance
<u>Operation in vehicle:</u> -----			



Top view of multiple plug
K1. 1 = term. 1

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical contact when measuring.

From multiple plug term.17 to central ground.

From multiple plug term. 5 to central ground.

Eliminate contact resistances at the plug-in connections.

Installation position of components:

Control unit: front passenger side in footwell on right-hand side behind a cover.

Central ground: in engine compartment, center, between 5th and 6th injection valves.

D21

Test chart for universal test adapter
BMW 745i Turbo



D22

Test chart for universal test adapter
BMW 745i Turbo



Test step 22		
Operation	Reading	Testing
Program switch position "V": ↓	Multimeter must indicate 0...10 Ω .	Component: Pressure switch
Program switch position: 16		
Measuring equipment: multimeter (ohm range)		Operation: Ground connection at term.26 on control unit.
Measuring range: X 1 Ω		
Connection: test sockets blue		Malfunction: Resistance outside tolerance
Operation in vehicle: operate pressure switch (switch point 0.85...1.05 bar)		

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical contact when measuring.

From multiple plug term.26 to pressure switch term.26. Test ground connection at pressure switch.

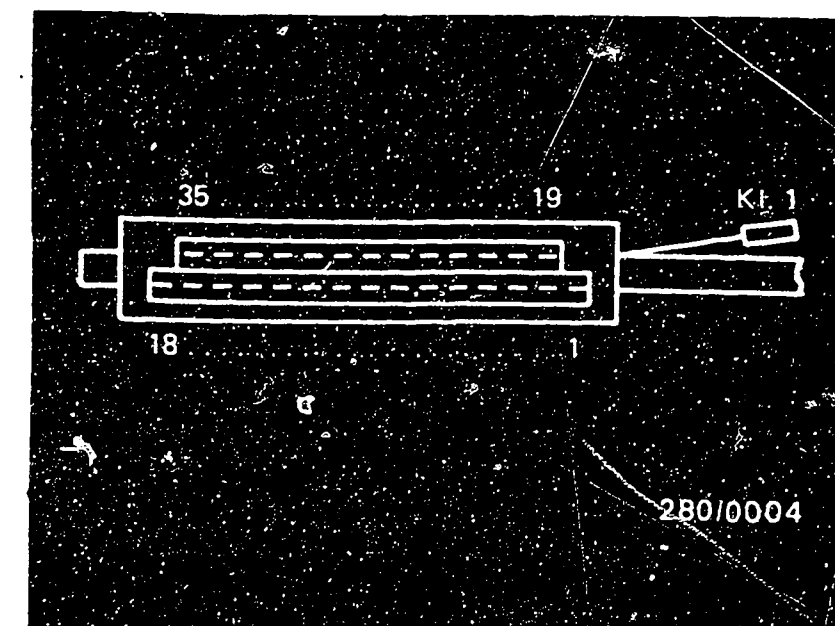
Test pressure switch for correct operation. Close pressure reducer for compressed air and loosen pressure line to pressure switch on intake manifold; slowly blow in compressed air to the pressure switch. At 0.85-1.05 bar the pressure switch must switch. At the same time the resistance between ground and term.26 on the pressure switch must drop from $\infty \Omega$ to 0 Ω .

Installation position of components

Control unit: front passenger side in footwell on right-hand side behind a cover.

Pressure switch (intake manifold): on firewall on right-hand side.

Central ground: in engine compartment between 5th and 6th injection valves.



Top view of multiple plug
K1. 1 = term. 1

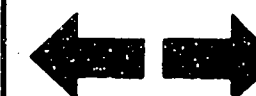
D23

Test chart for universal test adapter
BMW 745i Turbo



D24

Test chart for universal test adapter
BMW 745i Turbo



Testing with the universal test adapter is now completed.

The fuel pressure test must now be performed.

If a fault is found during a test, the test must be repeated after the fault has been eliminated.

The fuel pressure test is described on Coordinates E2...E11.

E1

Test chart for universal test adapter
BMW 745i Turbo



Fuel pressure test

Fuel pump operating? (listen).
Relay set O.K.?

no

1. Test relay set.

For testing, screw off relay set and turn round so that connection bases are accessible from below.

Test voltage supply.

Switch on ignition. Using voltmeter, measure battery voltage at term.88z, 88b, 88e and 88a to vehicle ground. If no voltage, test connecting leads.

Leads O.K.? If yes

2. Test resistance at relay set between term.86b (connection of positive pole) and term.85.

Test specification: 70...500 Ω .

Test specification O.K.? If yes

3. Start engine. Test voltage at disconnected pump plug (set value min. 12 V). If no voltage:

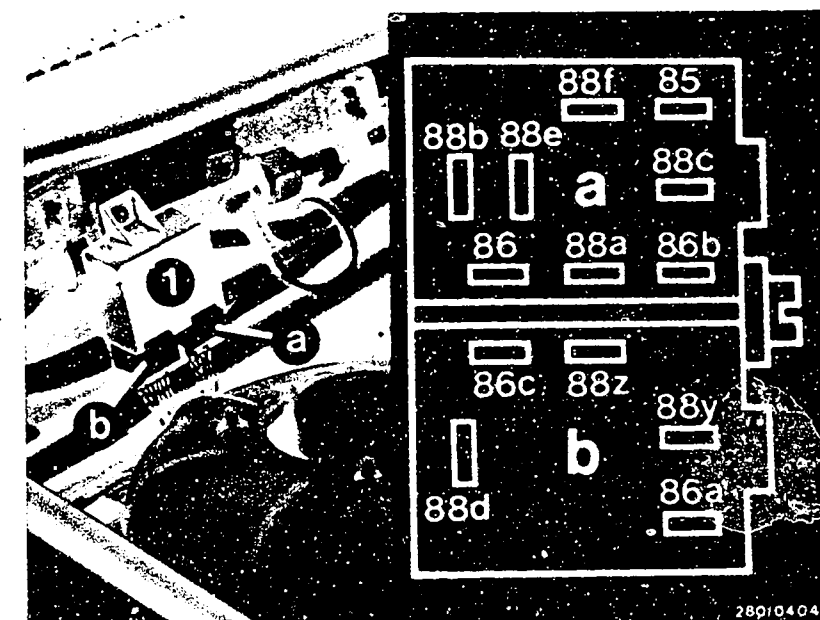
test voltage at pump fuse in central fuse box and relay set term.88y and 88d.

Voltage at term.88y → replace pump fuse.

No voltage at term.88d → replace relay set.

yes

Continued on E4/E5



1 = relay set

a = Jetronic wiring harness

b = vehicle wiring harness

top view of connection bases
(viewed from below)

1 = electric fuel pump

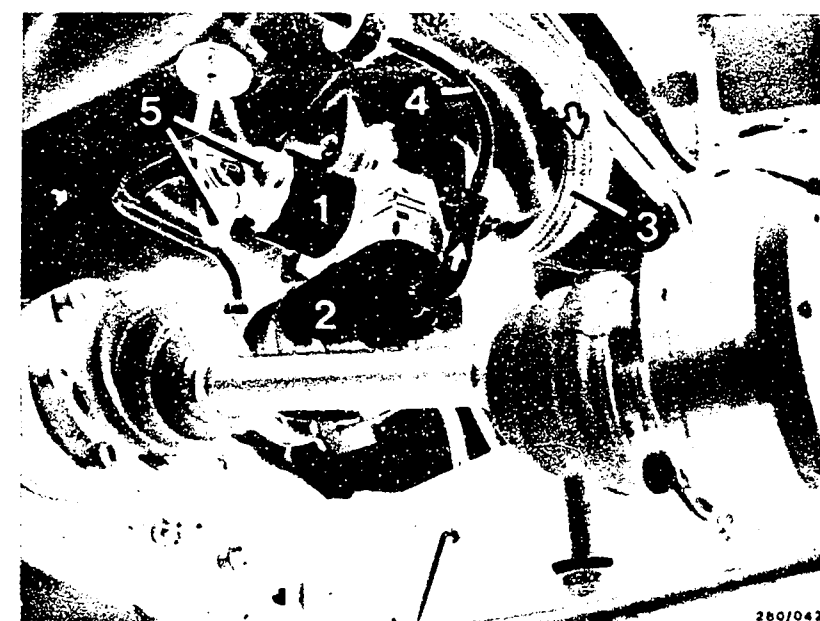
2 = fuel filter

3 = fuel intake line

4 = fuel delivery line

5 = fuel pump plug

arrow = direction of fuel flow



E2

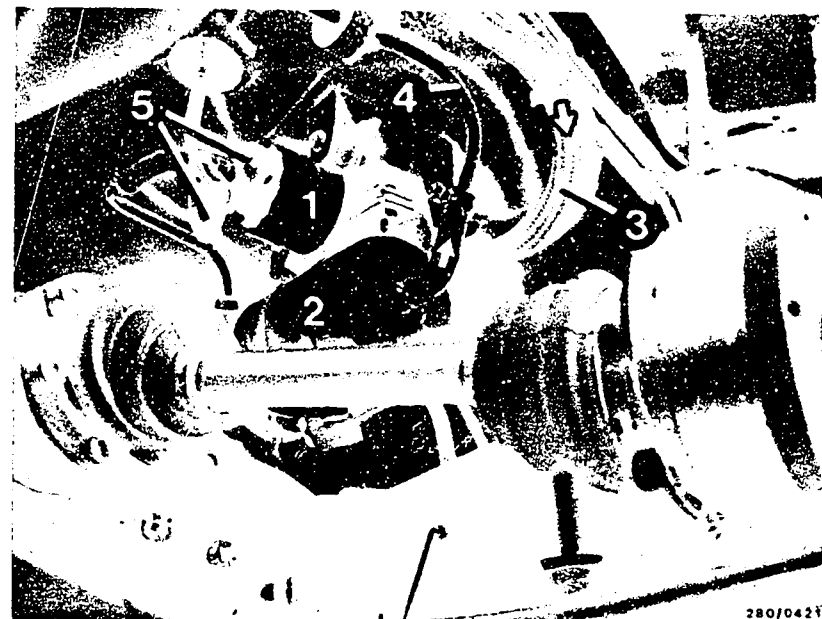
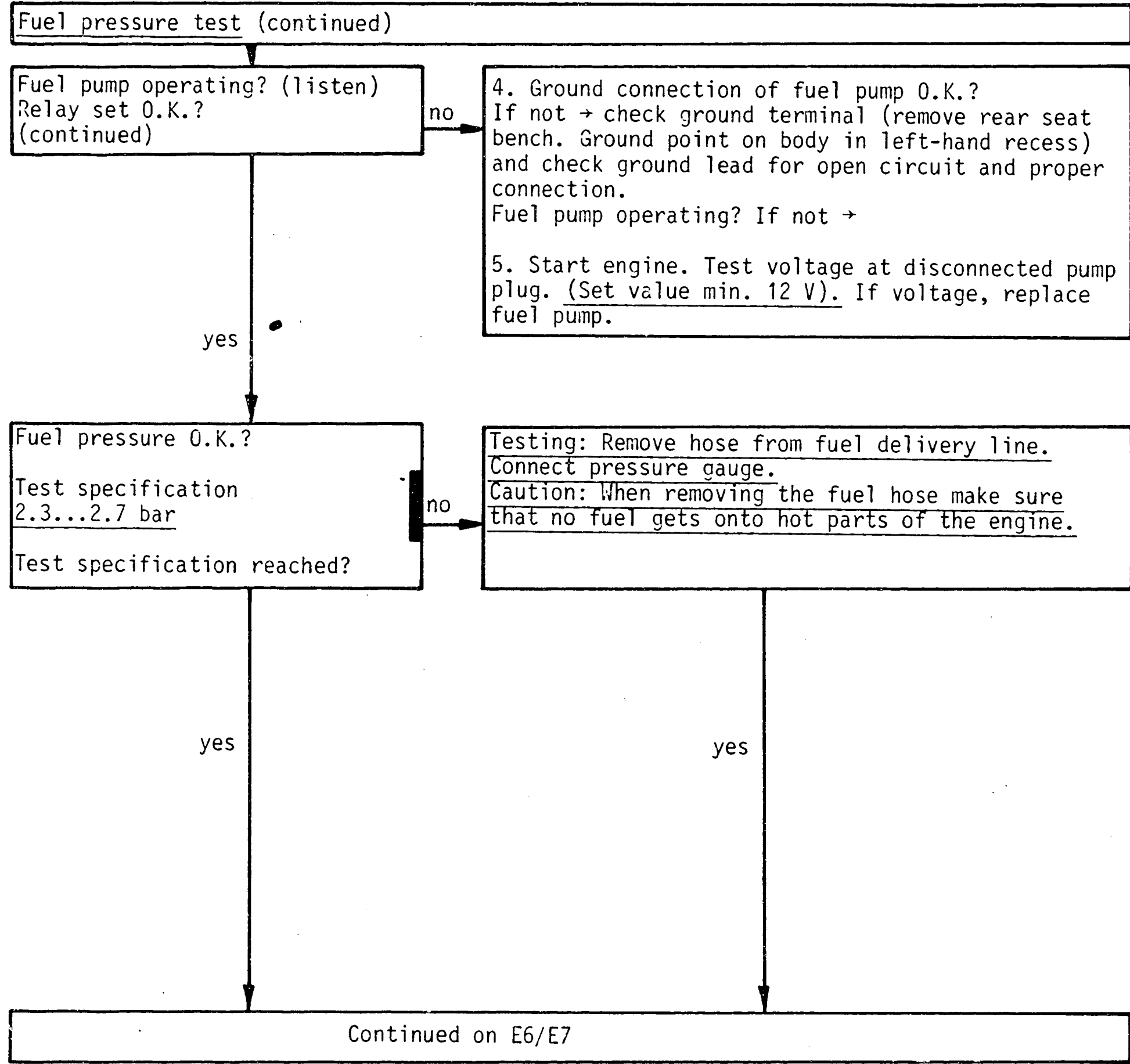
Fuel pressure test
BMW 745i Turbo



E3

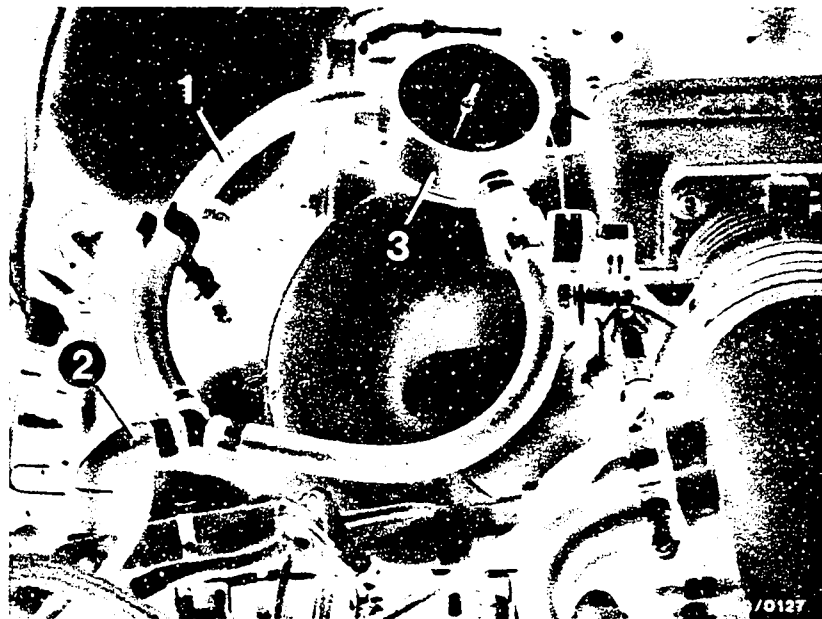
Fuel pressure test
BMW 745i Turbo





1 = fuel pump
5 = fuel pump plug
arrow = direction of fuel flow

1 = fuel delivery line (hose)
2 = fuel delivery line (connection to fuel-distribution pipe)
3 = fuel pressure gauge



E4

Fuel pressure test
BMW 745i Turbo



E5

Fuel pressure test
BMW 745i Turbo



Fuel pressure test (continued)

Fuel pressure O.K.?

Test specification

2.3...2.7 bar

Test specification reached?

no

Testing the fuel pressure

Connect the connections of the pressure testers into the fuel delivery line. If using pressure tester KDJE-P 100, close the hollow screw.

Plug the end of the hose onto the fuel-distribution pipe, and plug the Y-piece onto the fuel delivery hose.

Make sure there are no leaks.

Switch on ignition. Remove pipe-piece between air-filter and air-flow sensor. Slightly deflect air-flow sensor flap. (Pump contact must close).

Fuel pump must operate.

Fuel pump pressure

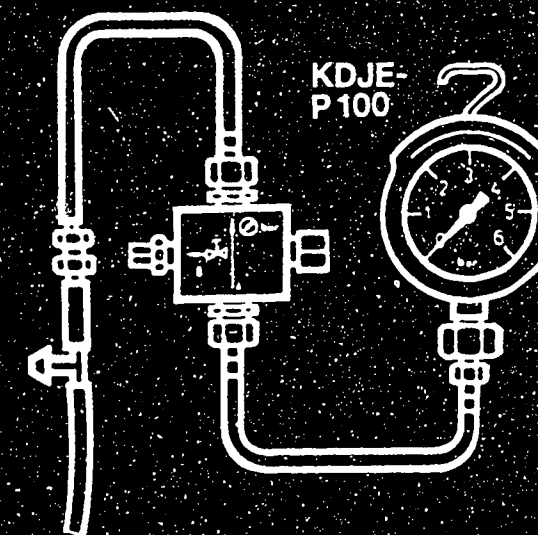
2.3...2.7 bar

Let engine idle →
fuel pump pressure approx. 2.0 bar

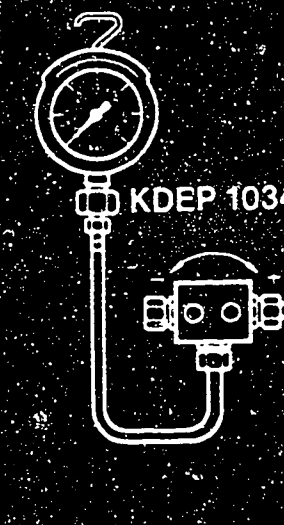
yes

yes

Continued on E8/E9



280/0331



280/0332



1687 231 154

280/0333

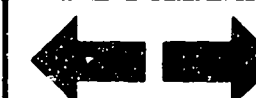
E6

Fuel pressure test
BMW 745i Turbo



E7

Fuel pressure test
BMW 745i Turbo



Fuel pressure test (continued)

Fuel pressure O.K.?

Test specification:

2.3...2.7 bar

Pressure regulator O.K.?

Test specification reached?

no

yes

Continued on E10/E11

Testing the pressure regulator

Switch on ignition. Remove pipe-piece between air-filter and air-flow sensor. Slightly deflect air-flow sensor flap. (Pump contact must close). Electric fuel pump must operate.

Fuel pump pressure
2.3...2.7 bar

Fuel pressure of 2.3 bar not reached:

1. Slowly pinch off fuel return line:

(Caution: Do not load pressure gauge above 6 bar. Pressure rises above 4 bar → replace pressure regulator.

Pressure remains below 4 bar → replace fuel pump.

2. Check fuel delivery line and fuel filter for throughflow.

3. Strainer in tank clogged.

4. Corrosion in tank.

Fuel pressure of 2.7 bar exceeded:

1. Fuel return line clogged or pinched.

2. Replace pressure regulator.

After testing is completed, refit the pipe-piece between air filter and air-flow sensor. Check the connection for leaks and check the ground connection (ground lead) on the air-flow sensor.



1 = pressure regulator

2 = fuel return hose

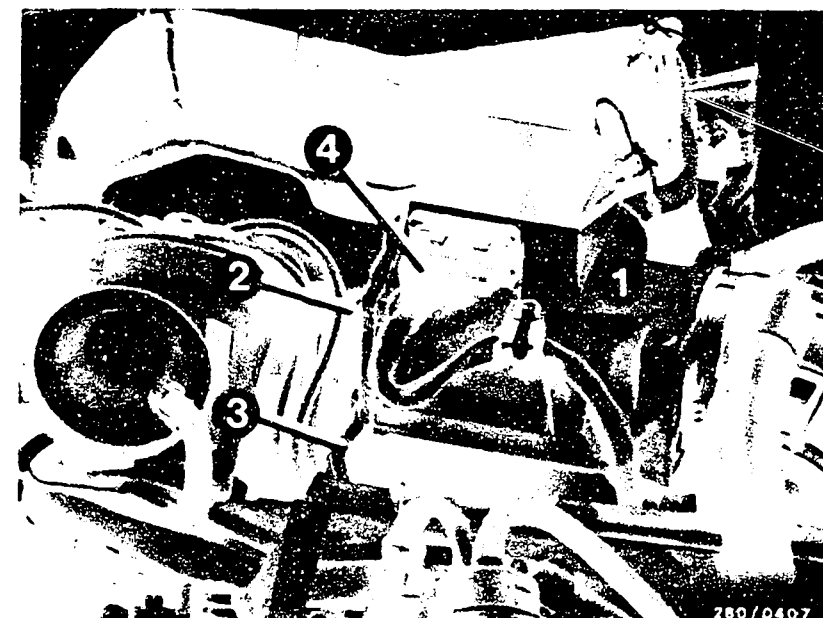
3 = to intake manifold

1 = air-flow sensor

2 = connecting screws for pipe-piece

3 = ground lead

4 = plug



E8

Fuel pressure test
BMW 745i Turbo



E9

Fuel pressure test
BMW 745i Turbo



Fuel pressure test (continued)

Does fuel pressure remain constant after the engine has started?

no

Test fuel pump contact in air-flow sensor:

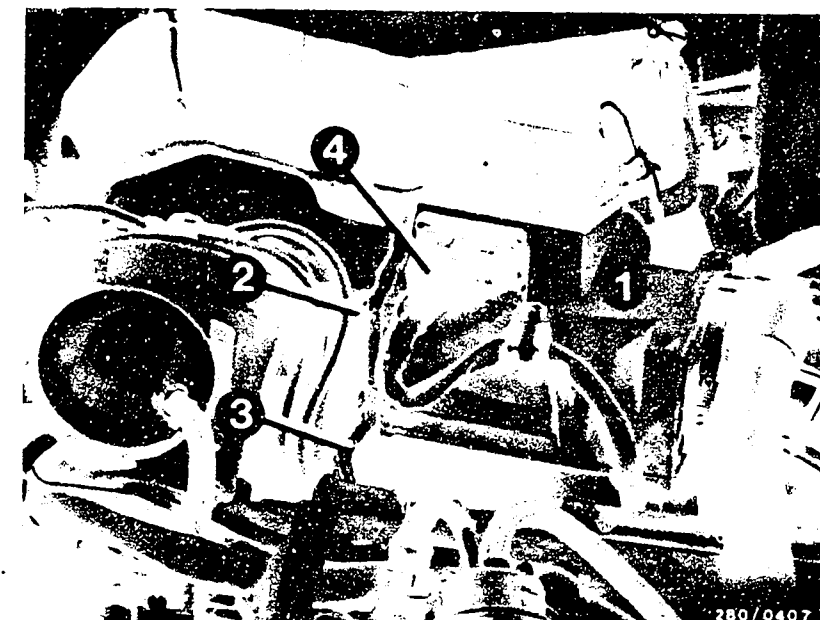
Remove air hoses and plug. Connect ohmmeter to term.36 and term.39 of air-flow sensor. Open air-flow sensor flap slightly by hand. Reading must change from $\infty \Omega$ to 0Ω . If not, replace air-flow sensor.

yes

The fuel pressure test is now completed. If the fault has not been found or if you require further information and instructions on how to remedy the fault, continue with the trouble-shooting program of your choice.

Detailed trouble-shooting → see B 3

Direct trouble-shooting → see B 5



- 1 = air-flow sensor
- 2 = connecting screws for pipe-piece
- 3 = ground lead
- 4 = plug



Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

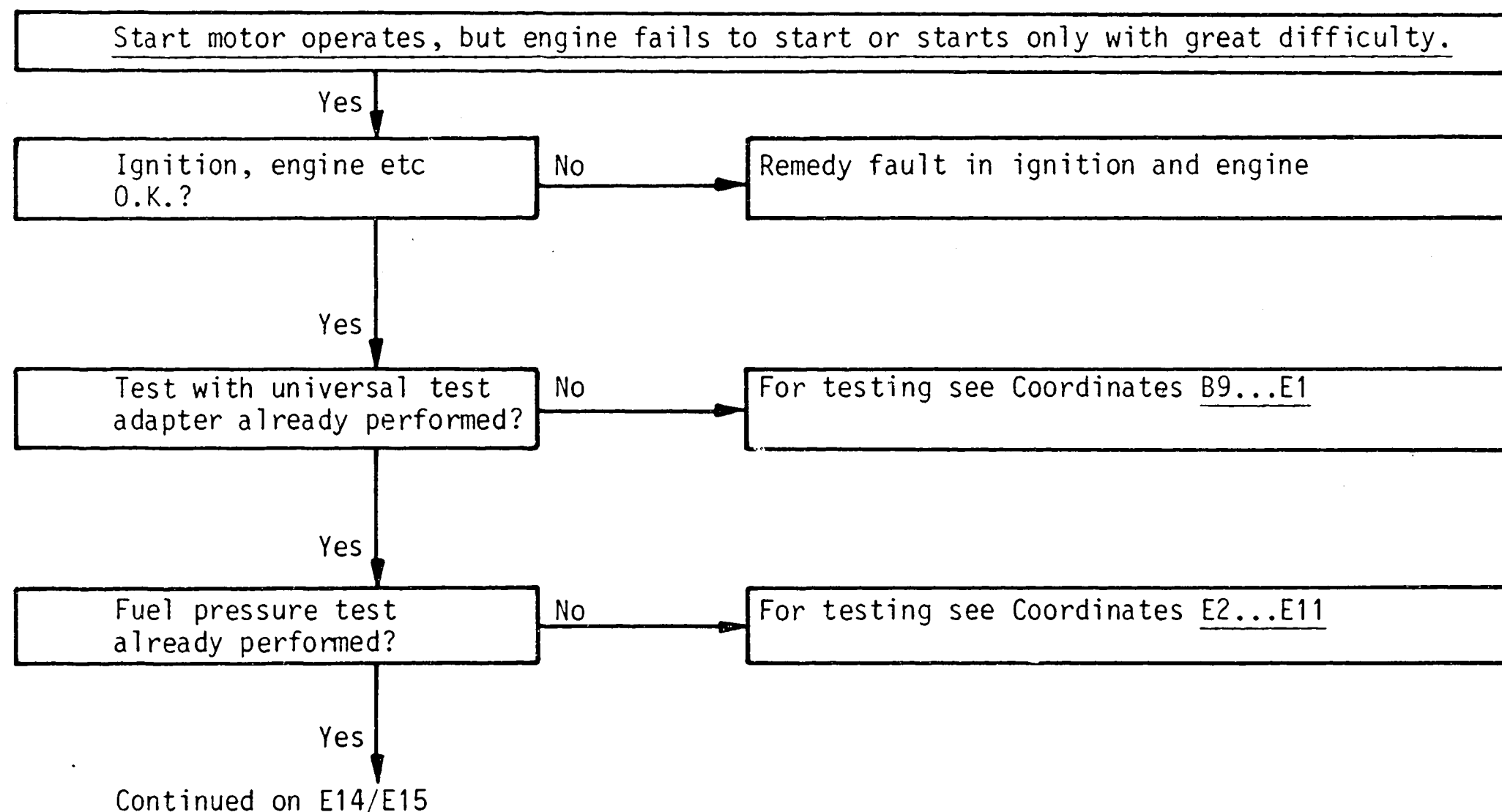
The program is divided into three rows of boxes:

1. The left-hand row contains the questions on the tests.
2. The middle row contains descriptions of the testing and adjustment operations on the components.
3. The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row and carry out the tests given there.

When you have finished testing, continue trouble-shooting at the point at which you branched off.



E12

Engine fails to start
BMW 745i Turbo



E13

Engine fails to start
BMW 745i Turbo



Starting motor operates, engine fails to start or starts only with great difficulty
(Continued)

Start valve O.K.?

No

Functional test: Test power supply to start valve when starting. To do this, remove plug from start valve and connect voltmeter to term. 46 and term. 45/term. 47 of start valve plug.

Coolant at ambient temperature (approx. + 15°... 30°C):

Voltage reading min. 6 V

Coolant with engine at normal operating temperature (approx. + 80°C):

Voltage reading approx. 0 V

Test the following leads for continuity with ohmmeter (set value approx. 0 Ω)

Lead from start valve term. 46 to thermo-time switch term. W.

Lead from start valve term. 45 to thermo-time switch term. G.

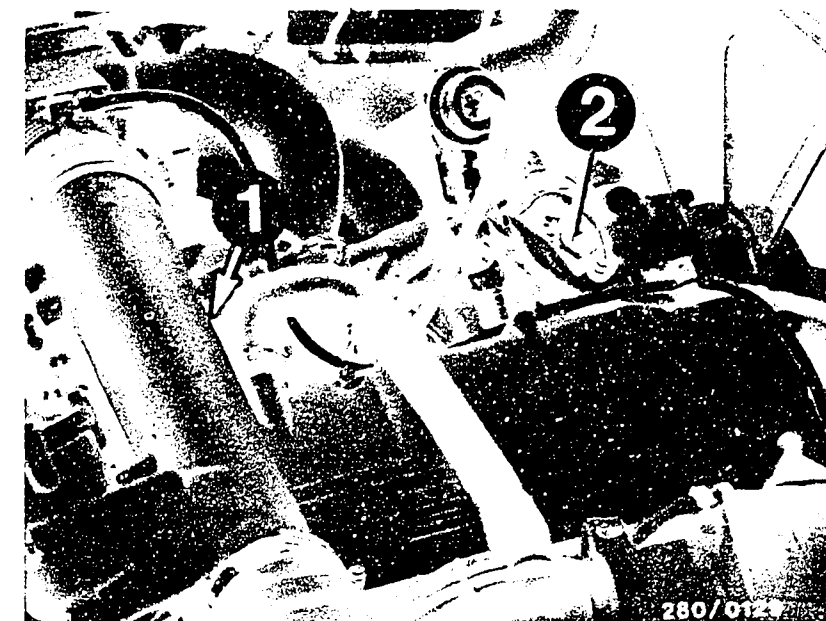
Lead from start valve term. 47 to relay set term. 86.

Check ground connection of thermo-time switch.

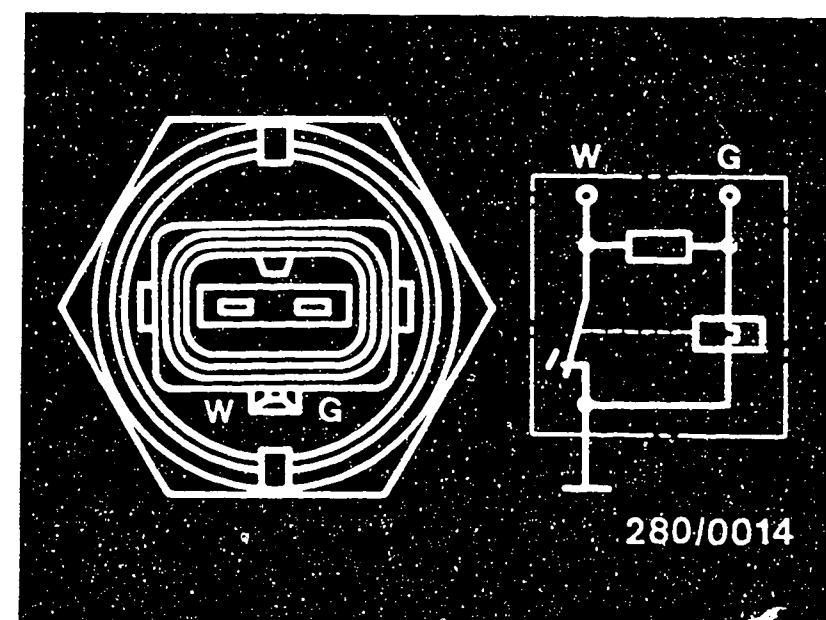
Yes

Yes

Continued on E 16/E 17



1=Start valve
2=Thermo-time switch



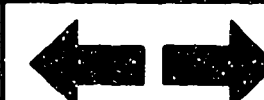
E14

Engine fails to start
BMW 745i Turbo



E15

Engine fails to start
BMW 745i Turbo



Starting motor operates, engine fails to start or starts only with great difficulty
(Continued)

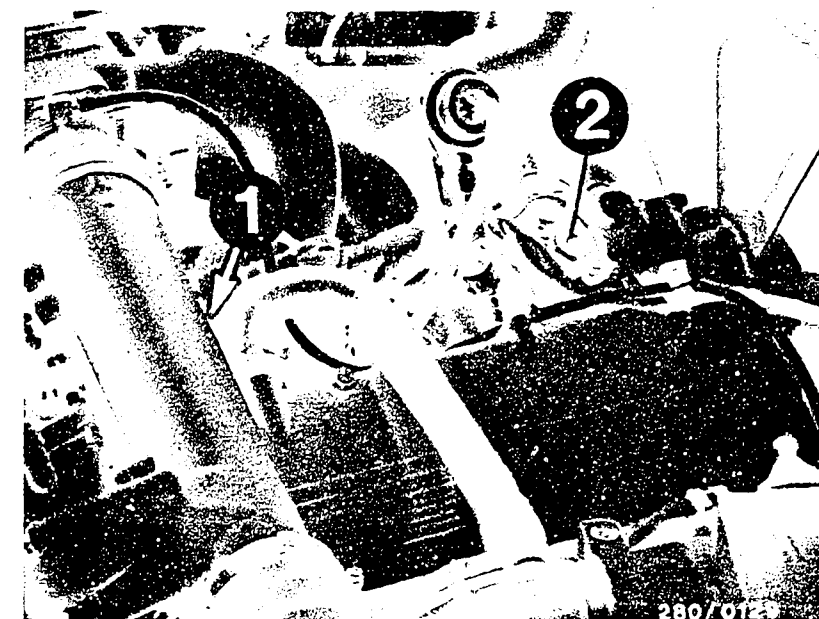
Start valve O.K.?
(Continued)

No

Electric test of start valve:
Connect ohmmeter to start valve (remove plug):
Set value approx. $4\ \Omega$.
Mechanical test of start valve:
Remove start valve from intake manifold and hold in a container. (Caution! Fire hazard!).
When starting at temperatures below ambient temperature (approx. $+15^{\circ}\dots 30^{\circ}\text{C}$) the start valve must squirt (max. 8 sec.). With the engine at normal operating temperature (approx. $+80^{\circ}\text{C}$) the start valve must not squirt. With the ignition switched on and the pressure built up the start valve must likewise not squirt.

Yes

Continued on E 18/E 19



1 = Start valve

2 = Thermo-time switch

E16

Engine fails to start
BMW 745i Turbo



E17

Engine fails to start
BMW 745i Turbo



Starting motor operates, engine fails to start or starts only with great difficulty
(continued)

Start valve O.K.?
(Continued)

No

Carry out squirt test for engine at normal operating temperature (approx. + 80°C) as follows:
Remove plug from thermo-time switch and ground term. W.

Testing the start valve for leaks:

1. When installed

Pinch off the fuel delivery line to the start valve. If engine then runs smoothly, replace start valve.

2. When removed

Remove start valve (Caution! Fire hazard!)

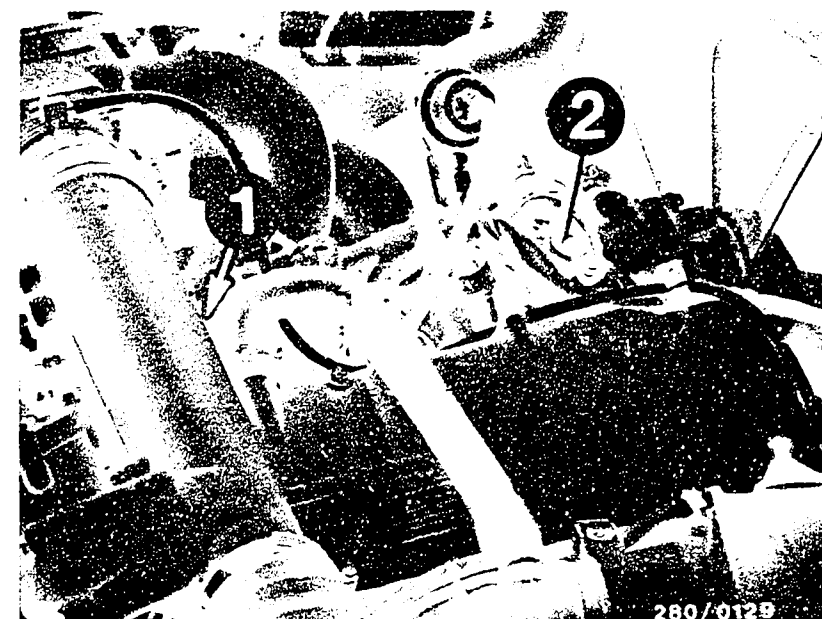
Fuel line and electric lead remain connected (place collector vessel under the start valve).

Build up fuel pressure (unscrew pipe piece between air filter and air-flow sensor. Ignition "ON" and deflect air-flow sensor flap).

Test specification: Within one minute max. 1 drop may form at the mouth of the valve.

Caution:

After testing is completed, refit the pipe piece between air filter and air-flow sensor. Make sure the hose clamp is tight. Test ground connection on air-flow sensor.



1 = Start valve
2 = Thermo-time switch

1 = Air-flow sensor
2 = Connecting screws for pipe piece
3 = Ground lead
4 = Plug



Continued on E20/E21

E18

Engine fails to start
BMW 745i Turbo



E19

Engine fails to start
BMW 745i Turbo



Starting motor operates, engine fails to start or starts only with great difficulty
(Continued)

Thermo-time switch
O.K.?

No

Electrical test

Test thermo-time switch 35°/8 sec. as follows:
Remove plug and make direct resistance measurement
at thermo-time switch using ohmmeter.

	Between term. "G" + ground	Between term. "W" + ground	Between term. "G" + "W"
Ambient temperature (below 30°C)	25...40 Ω	0 Ω	25...40 Ω
Engine at normal operating temperature (above 40°C)	50...80 Ω	100...160 Ω	50...80 Ω

Yes

Auxiliary-air device tested?
(Mechanically O.K.?)

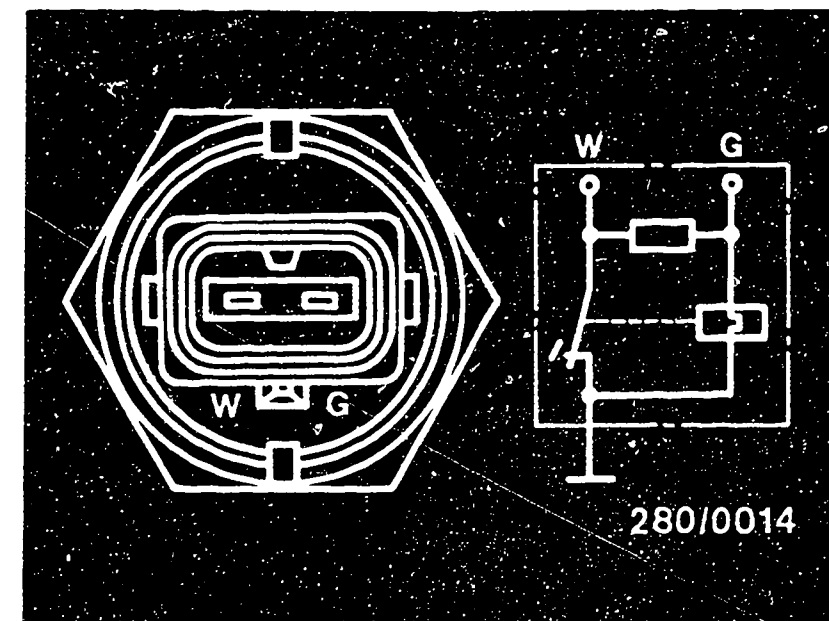
No

Testing:

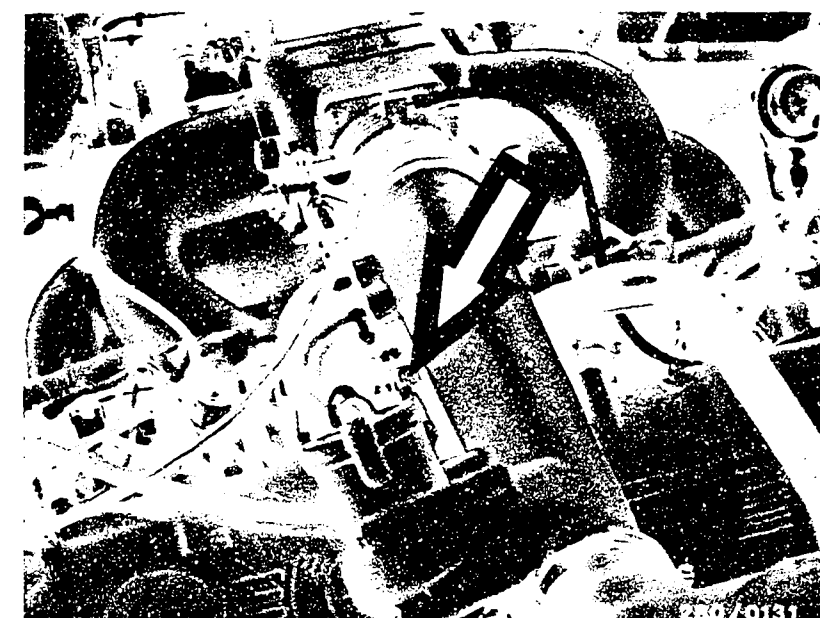
1. Visual examination of auxiliary-air device:
When cold, the device must be open; when the
engine is warm, it must be closed. If not, re-
place auxiliary-air device. (Remove hoses and
look down, possibly using a small mirror).
2. Functional test of auxiliary-air device:
With the engine cold, pinch off hose to
auxiliary-air device. Engine speed must drop.
With the engine warm, pinch off hose to aux-
iliary-air device. Engine speed must not drop.
If incorrect, replace auxiliary-air device
(pay attention to direction of flow).

Yes

Continued on E22/E23



Arrow = Auxiliary-air device



E20

Engine fails to start
BMW 745i Turbo



E21

Engine fails to start
BMW 745i Turbo



Starting motor operates, engine fails to start or starts only with great difficulty
(continued)

Temperature sensors tested?

No

Testing:

Temperature sensor I measures the intake air temperature and is located in the air duct of the air-flow sensor. Measure the following values between term. 27 and term. 6 of air-flow sensor:

At ambient temperature
(approx. +15...+30°C): 1.45...3.3kΩ

With engine at normal operating temperature
(approx. +80°C): 280...360 Ω

Make direct resistance measurement at temperature sensor II (engine) using ohmmeter.

Resistance measurement at term.13 and term. 49
(ground):

At ambient temperature
(approx. +15...+30°C): 1.3...3.6kΩ

With engine at normal operating temperature
(approx. +80°C): 250...390 Ω

If incorrect, check for open circuit or short circuit in following leads using ohmmeter:

Temperature sensor I:

Multiple plug term. 27 to air-flow sensor term. 27 and air-flow sensor term. 6 to multiple plug term. 6.

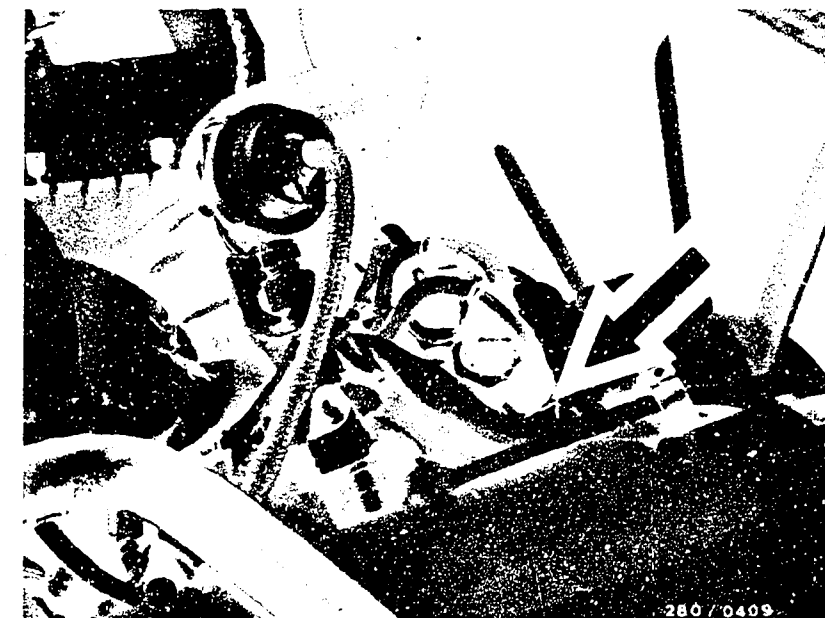
Temperature sensor II:

Multiple plug term. 13 to temperature sensor II term. 13 and temperature sensor II term. 49 to central ground (lead 49).

Check all contacts in the plug-in connections.

Yes

Continued on F1/F2



Arrow = Temperature sensor II
(engine) (white plug)

E22

Engine fails to start
BMW 745i Turbo



E23

Engine fails to start
BMW 745i Turbo



Starting motor operates, engine fails to start or starts only with great difficulty
(Continued)

Air-flow sensor O.K.?

No

Testing:

Unscrew pipe piece between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor. Connect ohmmeter to term. 7 and term. 8 of air-flow sensor. Deflect sensor flap.

Test specification: $200 \dots 1000 \Omega$

Caution! After testing is completed, refit the pipe piece between air filter and air-flow sensor. Check connection for leaks and check ground lead on air-flow sensor.

Yes

Engine missing due to interference
Engine running O.K.?

No

Test internal resistance of spark-plug connectors and distributor connectors as well as of H.T. ignition cables.

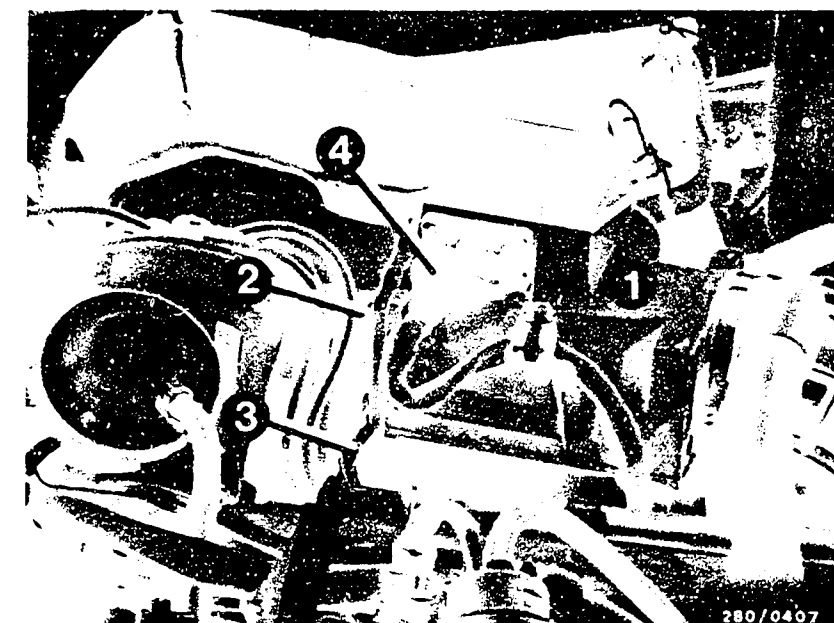
Interference-suppression resistor of spark-plug connectors:

$1.2 \text{ k}\Omega$ to $1.6 \text{ k}\Omega$

If interference-suppression resistors of less than 500Ω are found, they must be replaced.

Yes

Continued on F3/F4



1 = Air-flow sensor

2 = Connecting screws for pipe piece

3 = Ground lead

4 = Plug

F1

Engine fails to start

BMW 745i Turbo



F2

Engine fails to start

BMW 745i Turbo



Starting motor operates, engine fails to start or starts only with great difficulty
(Continued)

Are all hose lines and electric leads securely attached?
Visual examination.
Is the air-intake system leak-tight?

No

Check whether hoses of air-intake system and of fuel line system are securely attached, not kinked or damaged. If necessary, replace hoses. Eliminate leaks with new seals or by re-tightening the connecting screws.

Checking for leaks: Seal off exhaust tail pipe. Unscrew pipe piece from air filter to air-flow sensor on air-flow sensor and seal off air-flow sensor duct. Pull off hose after auxiliary-air device and blow air (0.3 bar) into the intake manifold with a compressed-air gun. Seal off connection port on auxiliary-air device. Open throttle valve fully while doing this. Brush or spray all joints with soapy water. Bubbling or foaming indicates a leak. Check electric contacts for loose connection.

Yes

Testing completed for customer complaint

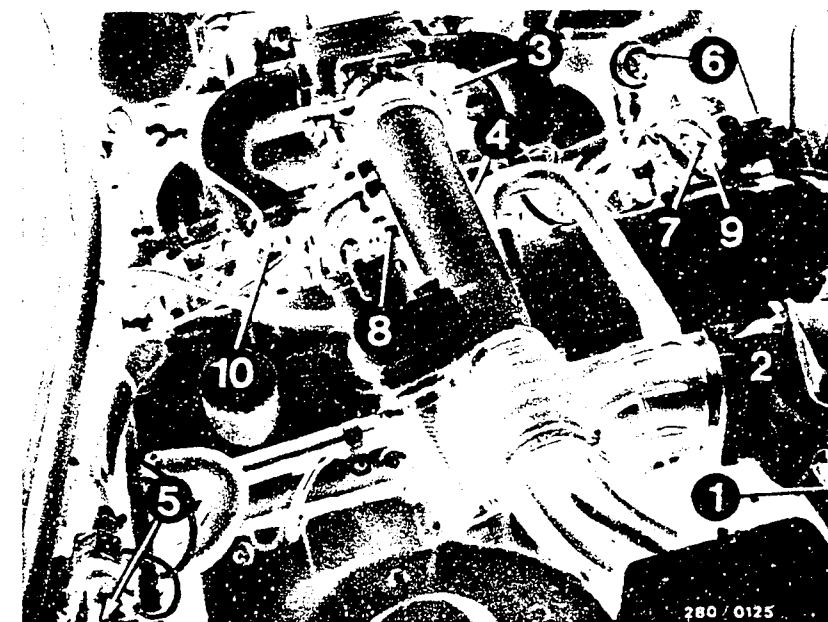
"Starting motor operates, engine fails to start"

Customer complaint remedied?

No

Further possibilities:

- Customer complaint incorrectly diagnosed (see Coordinates B3...B8). If the fault has not been detected by "Direct trouble-shooting", see "Detailed trouble-shooting" (Coordinates B3/B4).
- Engine not mechanically O.K. (Compression, valve setting, valve timing, worn camshaft).



- 1=Air filter
2=Air-flow sensor
3=Throttle-valve switch
4=Start valve
(blue plug)
8=Auxiliary-air device

F3

Engine fails to start

BMW 745i Turbo



F4

Engine fails to start

BMW 745i Turbo



Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

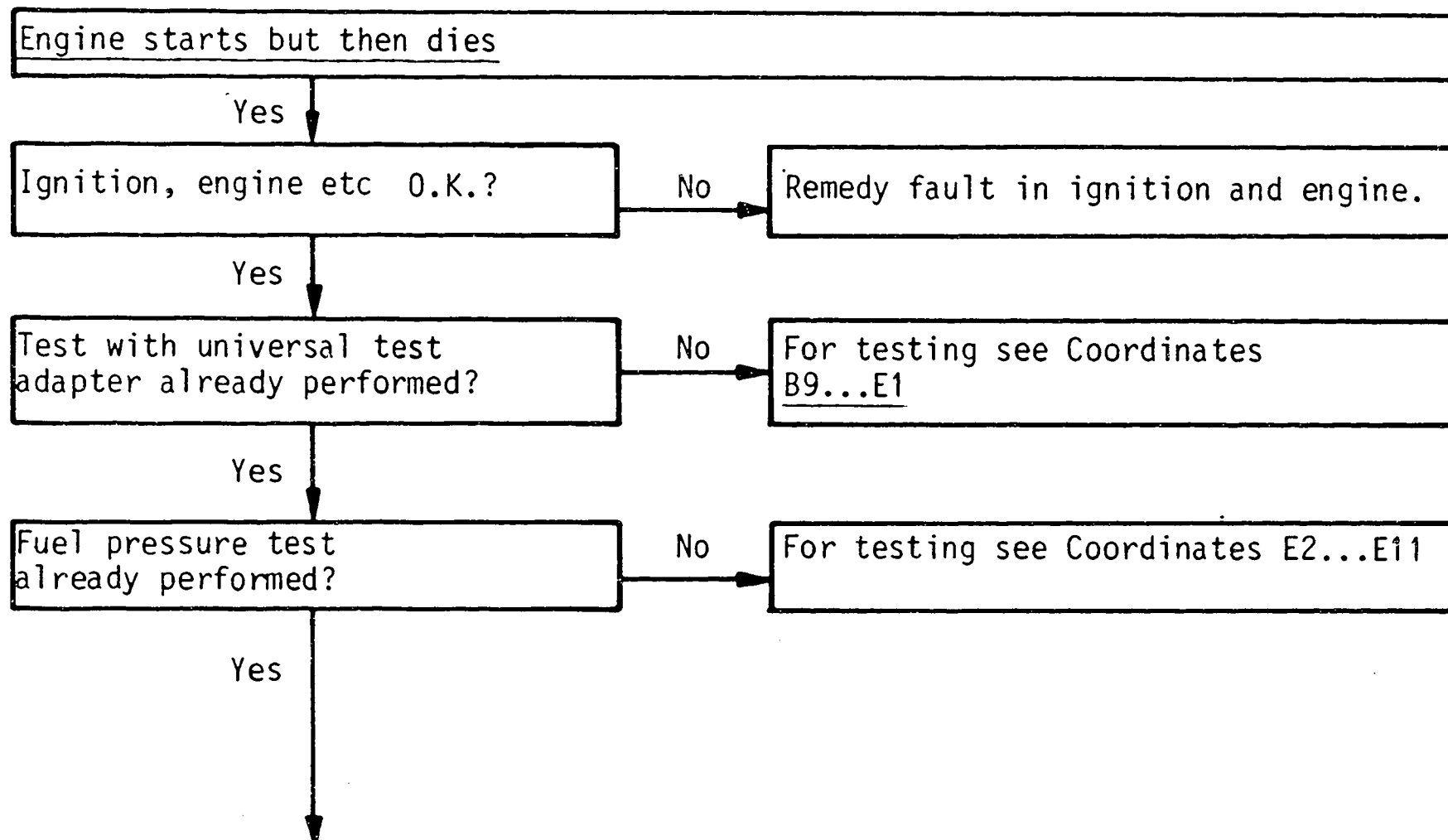
The program is divided into three rows of boxes:

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If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row and carry out the tests given there.

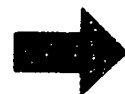
When you have finished testing, continue trouble-shooting at the point at which you branched off.



Continued on F7/F8

F5

Engine starts but then dies
BMW 745i Turbo



F6

Engine starts but then dies
BMW 745i Turbo



Engine starts but then dies (Continued)

Start valve O.K.?
(Leak test)

No

Testing the start valve for leaks:

1. When installed

Pinch off the fuel delivery line to the start valve. If engine then runs smoothly, replace start valve.

2. When removed

Remove start valve (Caution! Fire hazard!). Fuel line and electric lead remain connected (place collector vessel under the start valve). Build up fuel pressure (unscrew pipe piece between air filter and air-flow sensor. Ignition "ON" and deflect air-flow sensor flap).

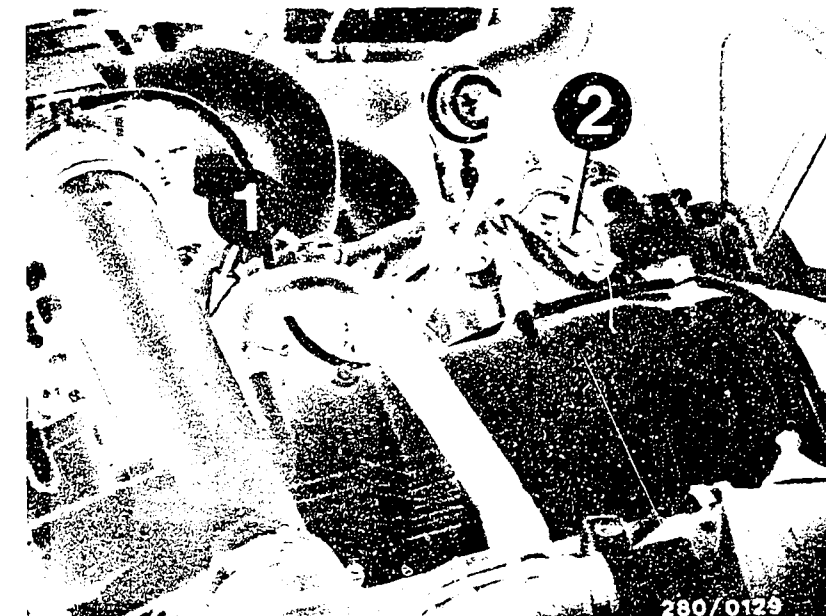
Test specification: Within one minute max. 1 drop may form at the mouth of the valve.

Caution!

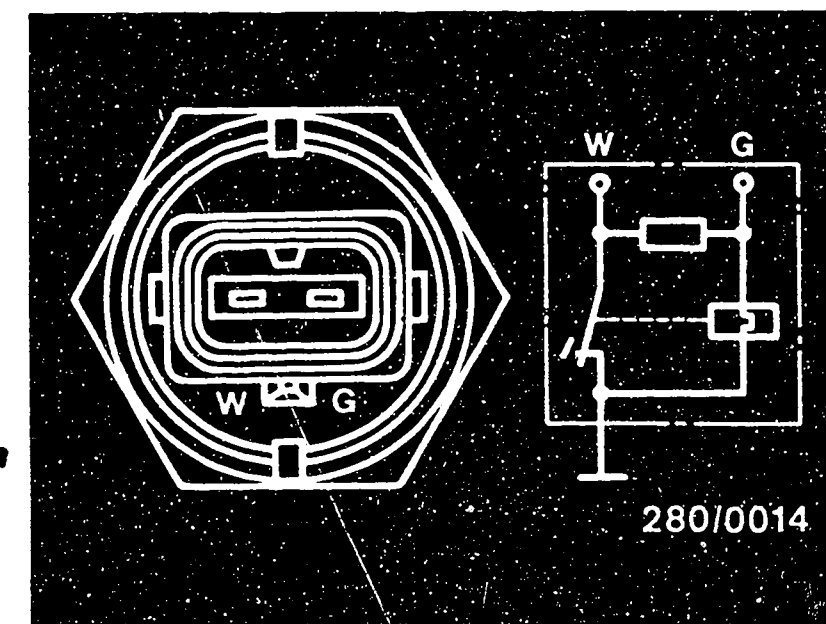
After testing is completed, refit the pipe piece between air filter and air-flow sensor. Check connection for leaks and check ground connection (ground lead) on air-flow sensor.

Yes

Continued on F 9/F 10



1=Start valve
2=Thermo-time switch



F7

Engine starts and then dies
BMW 745i Turbo



F8

Engine starts and then dies
BMW 745i Turbo



Engine starts but then dies (continued)

Auxiliary-air device tested?
(Mechanically and electrically
O.K.?)

No

Testing:

1. Visual examination of auxiliary air device:
When cold, the device must be open; when the engine is warm, it must be closed. If not, replace auxiliary-air device.
(Remove hoses and look down, possibly using a small mirror).
2. Functional test of auxiliary-air device:
With the engine cold, pinch off hose to auxiliary-air device. Engine speed must drop.
With the engine warm, pinch off hose to auxiliary-air device. Engine speed must not drop.
If incorrect, replace auxiliary-air device (pay attention to direction of flow).

Yes

Temperature sensors tested?

No

Testing:

Temperature sensor I measures the intake-air temperature and is positioned in the air duct of the air-flow sensor.

Measure the following values between term. 27 and term. 6 of the air-flow sensor:

1. At ambient temperature (approx. +15 to +30°C)

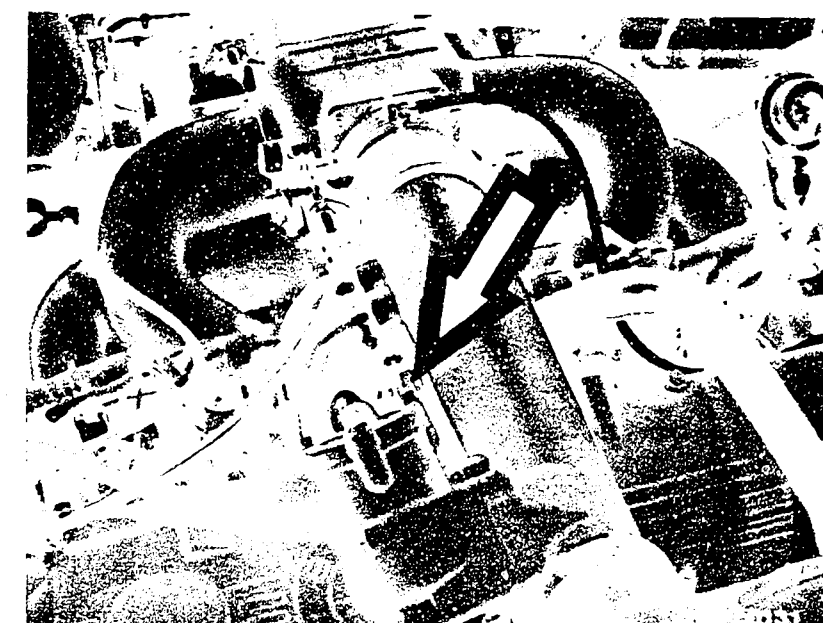
1.45...3.3 kΩ

2. With engine at normal operating temperature (approx. +80°C)

280...360 Ω

Yes

Continued on F11/F12



Arrow = Auxiliary-air device

F9

Engine starts but then dies

BMW 745i Turbo



F10

Engine starts but then dies

BMW 745i Turbo



Engine starts but then dies (continued)

Temperature sensors tested?
(continued)

No

Using ohmmeter, make direct resistance measurement at temperature sensor II (engine). Resistance measurement at term. 13 and term. 49 (ground):

1. At ambient temperature (approx. +15 to +30°C)

1.30...3.60 kΩ

2. With engine at normal operating temperature (approx. +80°C)

250...390 Ω

If incorrect, check following leads with ohmmeter for open circuit or short circuit:

Temperature sensor I:

Multiple plug term. 27 to air-flow sensor term. 27 and air-flow sensor term. 6 to multiple plug term. 6.

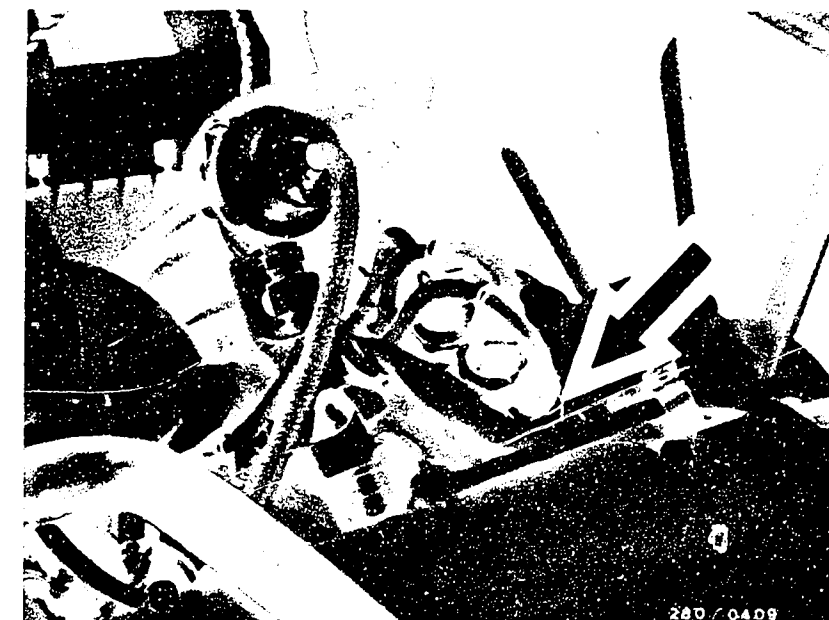
Temperature sensor II:

Multiple plug term. 13 to temperature sensor II term. 13 and temperature sensor II term. 49 to central ground (Lead 49).

Check all contacts in plug-in connections

Yes

Continued on F13/F14



Arrow = Temperature sensor II
(Engine) white plug

F11

Engine starts but then dies
BMW 745i Turbo



F12

Engine starts but then dies
BMW 745i Turbo



Engine starts but then dies (Continued)

Air-flow sensor O.K.?

No

Testing:

Unscrew pipe piece between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor. Connect ohmmeter to term. 7 and term. 8 of air-flow sensor. Deflect sensor flap.

Test specification: 200...1000 Ω

Checking the pump contact:

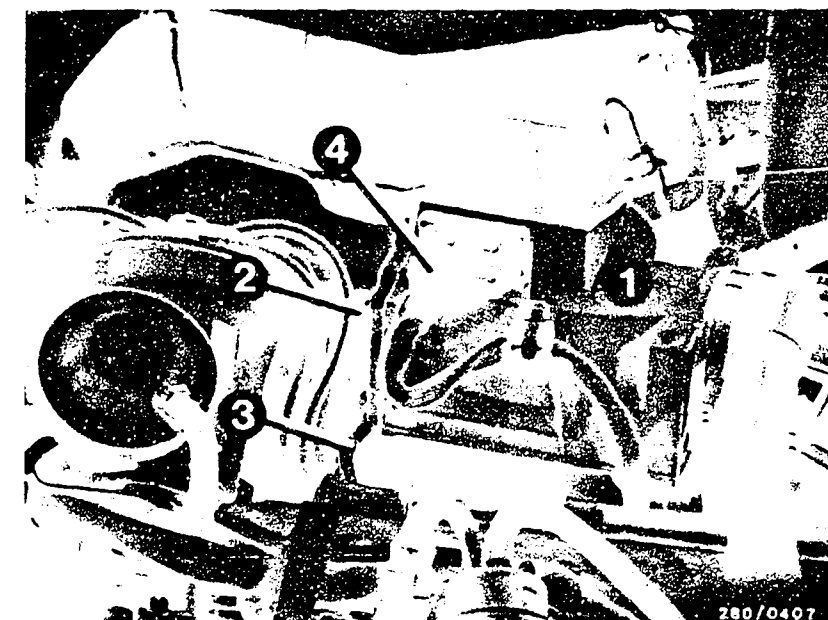
Remove plug from air-flow sensor. Measure resistance between term. 36 and term. 39 using ohmmeter. Deflect air-flow sensor flap. Set value approx. 0 Ω .

Caution:

After testing is completed, refit the pipe piece between air filter and air-flow sensor. Check connection for leaks and check ground lead on air-flow sensor.

Yes

Continued on F 15/F 16



1=Air-flow sensor

2=Connecting screws for pipe piece

3=Ground lead

4=Plug

F13

Engine starts but then dies

BMW 745i Turbo



F14

Engine starts but then dies

BMW 745i Turbo



Engine starts but then dies (continued)

Are all hose lines and electric leads securely attached?
Visual examination. Is the air-intake system leak-tight?

No

Check whether hoses of air-intake system and of fuel line system are securely attached, not kinked or damaged. If necessary, replace hoses. Eliminate leaks with new seals or by re-tightening the connecting screws.

Checking for leaks:

Seal off exhaust tail pipe. Screw off hose from air filter to air-flow sensor on air-flow sensor and seal off air-flow sensor duct. Pull off hose after auxiliary-air device and blow air (0.3 bar) into the intake manifold with a compressed-air gun. Seal off connection port on auxiliary-air device. Open throttle valve fully while doing this. Brush or spray all joints with soapy water. Bubbling or foaming indicates a leak.

Check electric contacts for loose connection.

Yes

Testing completed for customer complaint

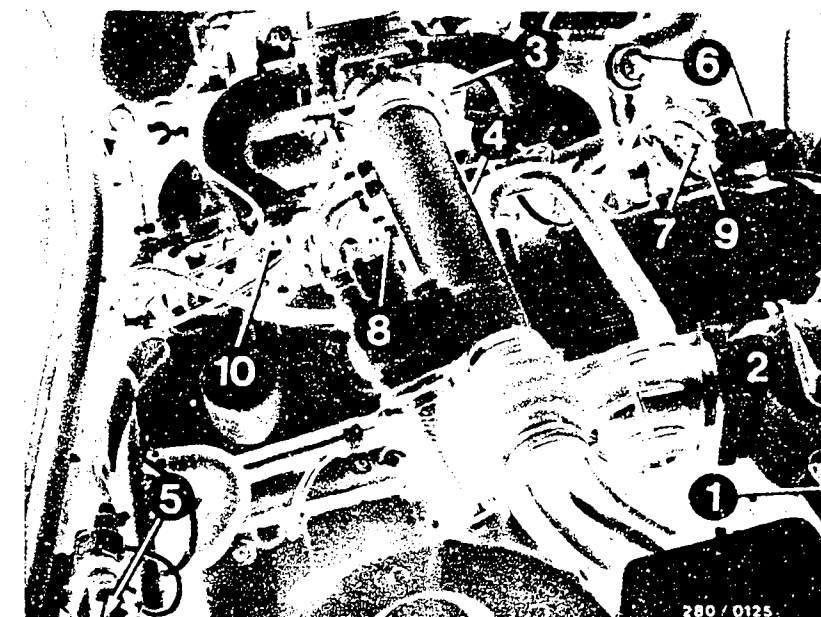
"Engine starts but then dies"

Customer complaint remedied?

No

Further possibilities:

- Customer complaint incorrectly diagnosed (see Coordinates B3...B8). If the fault has not been detected by "direct trouble-shooting", see "detailed trouble-shooting" (Coordinates B3/B4).
- Engine not mechanically O.K. (Compression, valve setting, valve timing, worn camshaft).



- 1 = Air filter
- 2 = Air-flow sensor
- 3 = Throttle-valve switch
- 4 = Start valve (blue plug)
- 8 = Auxiliary-air device

F15

Engine starts but then dies

BMW 745i Turbo



F16

Engine starts but then dies

BMW 745i Turbo



Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

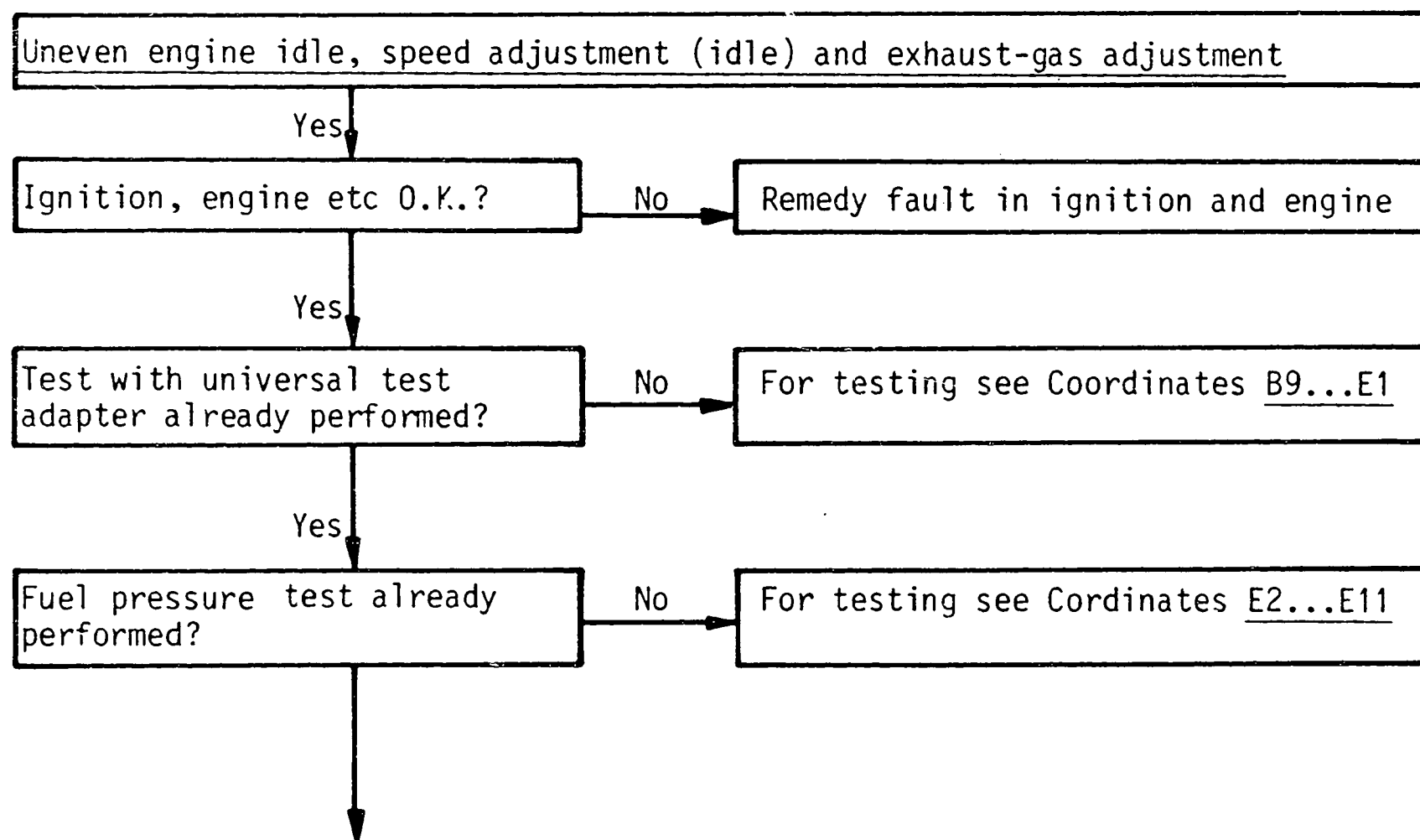
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If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row and carry out the tests given there.

When you have finished testing, continue trouble-shooting at the point at which you branched off.



Continued on G3/G4

G1

Uneven engine idle
BMW 745i Turbo



G2

Uneven engine idle
BMW 745i Turbo



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment (continued)

Throttle valve closed?

No

Testing:

Throttle valve closed?

Check whether the throttle valve can be closed still further and whether the engine speed thereby drops.

Visual examination: Loosen hose clamp (5) and push back charge-air tube (4).

Setting the throttle-valve stop:

a) Throttle-cable:

Throttle-plate lever at stop.

Screw in knurled nut on cable until only minimal play is left.

b) Bowden cable for automatic transmission:

In idle position, set the play "S" to 0.25... 0.75 mm.

Setting the throttle-valve switch: Slightly loosen fastening screws. Connect ohmmeter to term. 2 and term. 18. Turn the throttle-valve switch to the right until the idle contact (microswitch) can be heard to click. (Reading 0Ω). Checking the setting: Pull slightly on the throttle cable. The idle contact must be heard to click.

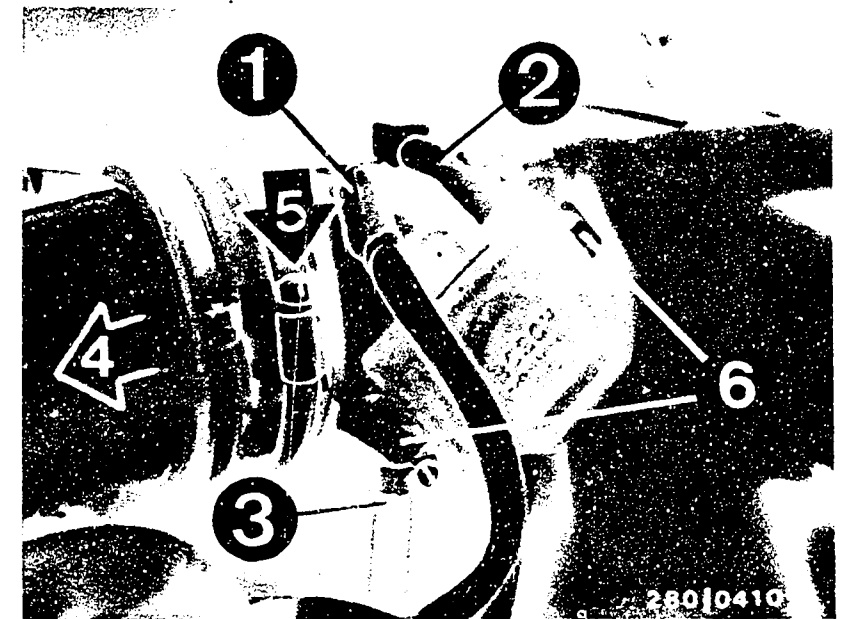
Trouble-shooting:

Check the following leads for continuity using ohmmeter (set value approx. 0Ω):

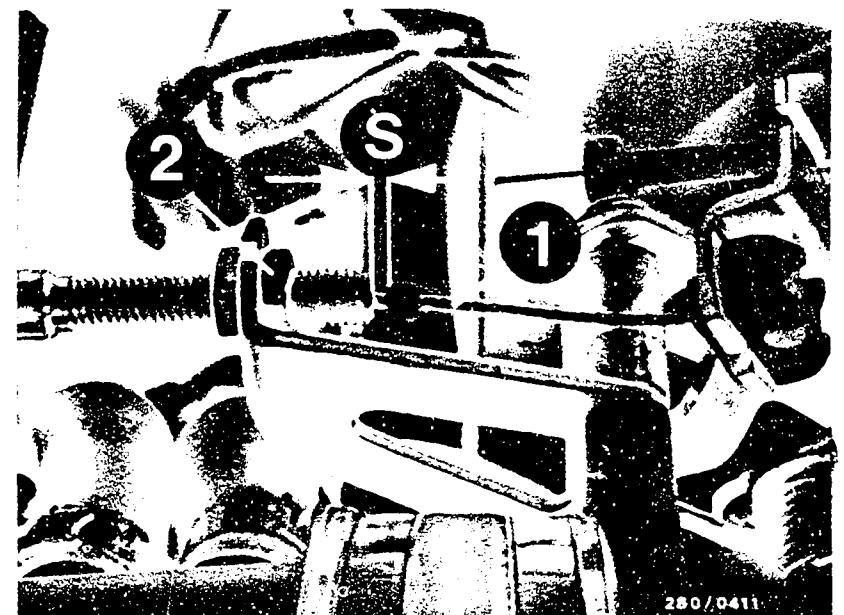
From multiple plug term. 2 to throttle-valve switch term. 2. From the throttle-valve switch term. 18 to multiple plug term. 18. Eliminate contact resistances in plug-in connections.

Yes

Continued on G5/G6



- 1 = Throttle-valve switch
- 2 = Vacuum hose to distributor retard unit
- 3 = Vacuum hose to distributor advance unit
- 4 = Charge-air tube
- 5 = Hose clamp
- 6 = Fastening screws
- 1 = Throttle cable
- 2 = Lock nut
- S = Setting dimension



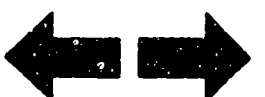
G3

Uneven engine idle
BMW 745i Turbo



G4

Uneven engine idle
BMW 745i Turbo



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment (Continued)

CO and idle speed correctly adjusted?

No

Yes

Can engine speed not be adjusted?

Continued on G 7/G 8

CO and idle adjustment

Exhaust-gas test with CO analyzer with engine at normal operating temperature and at idle speed

Idle speed

Manually-shifted transmission, automatic transmission (selector lever in position P):

800...900 min⁻¹

CO setting

81 model

(Ignition distributor No. 0 237 304 017):

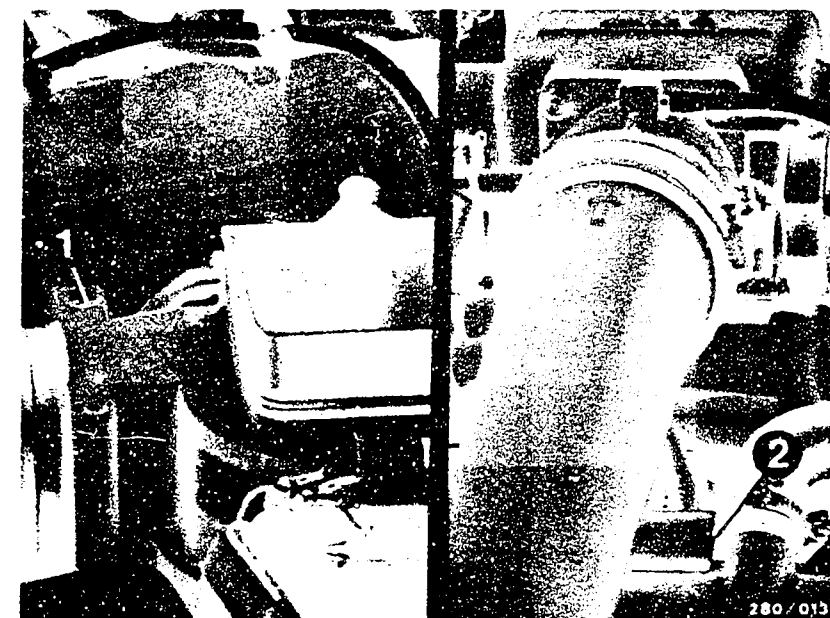
0.5...2.0% by vol. CO

82 model

(Ignition distributor No. 0 237 306 047):

Less than 1.5% by vol. CO

If CO concentration too high, turn bypass screw (CO adjusting screw) in air-flow sensor half a turn in a counterclockwise direction. Check engine speed and CO concentration again. Carry out adjustments in several steps. After adjusting, use new plugs.



1=CO adjusting screw

2=Idle-speed-adjusting screw

G5

Uneven engine idle
BMW 745i Turbo



G6

Uneven engine idle
BMW 745i Turbo



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment (Continued)

Thermo-time switch O.K.?

No

Electrical test:

Test thermo-time switch 35°/8 sec. as follows. Remove plug and make direct resistance measurement at thermo-time switch using ohmmeter.

1. Between term. "G" and ground at ambient temperature (below +30°C): 25...40 Ω. With engine approximately at normal operating temperature (above +40°C): 50...80 Ω.
2. Between term. "W" and ground at ambient temperature (below +30°C): 0 Ω. With engine approximately at normal operating temperature (above +40°C): 100...160 Ω.
3. Between term. "G" and "W" at ambient temperature (below +30°C): 25...40 Ω. With engine approximately at normal operating temperature (above +40°C): 50...80 Ω.

Yes

Start valve O.K.?

No

Testing the start valve for leaks:

1. When installed

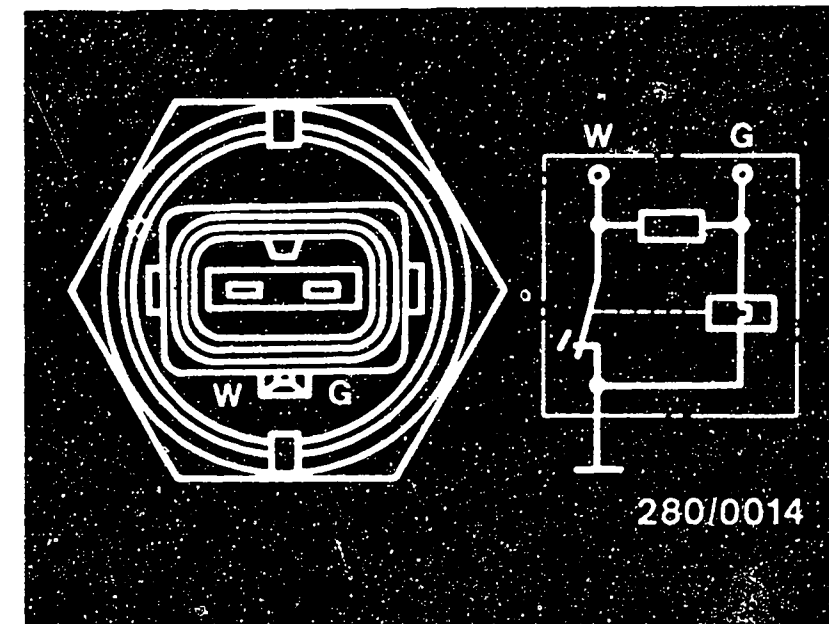
Pinch off the fuel delivery line to the start valve. If engine then runs smoothly, replace start valve.

2. When removed

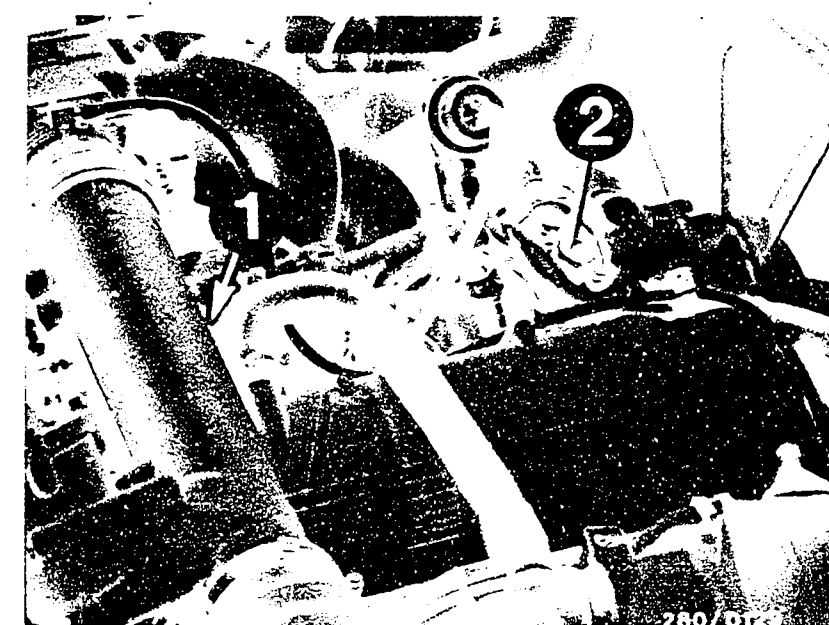
Remove start valve (Caution! Fire hazard!). Fuel line and electric lead remain connected (place collector vessel under the start valve). Build up fuel pressure (unscrew pipe piece between air filter and air-flow sensor. Ignition "ON" and deflect air-flow sensor flap).

Yes

Continued on G 9/G 10



1=Start valve
2=Thermo-time switch



G7

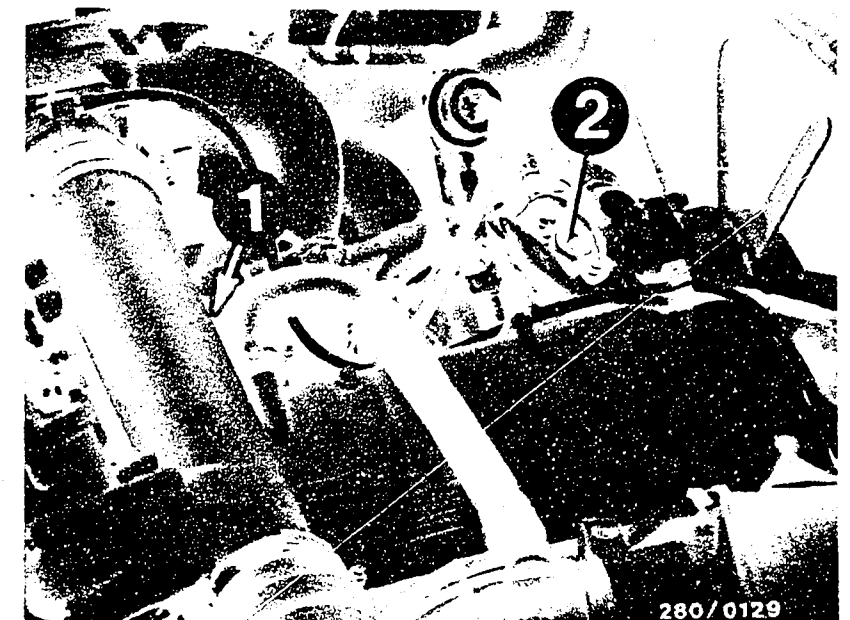
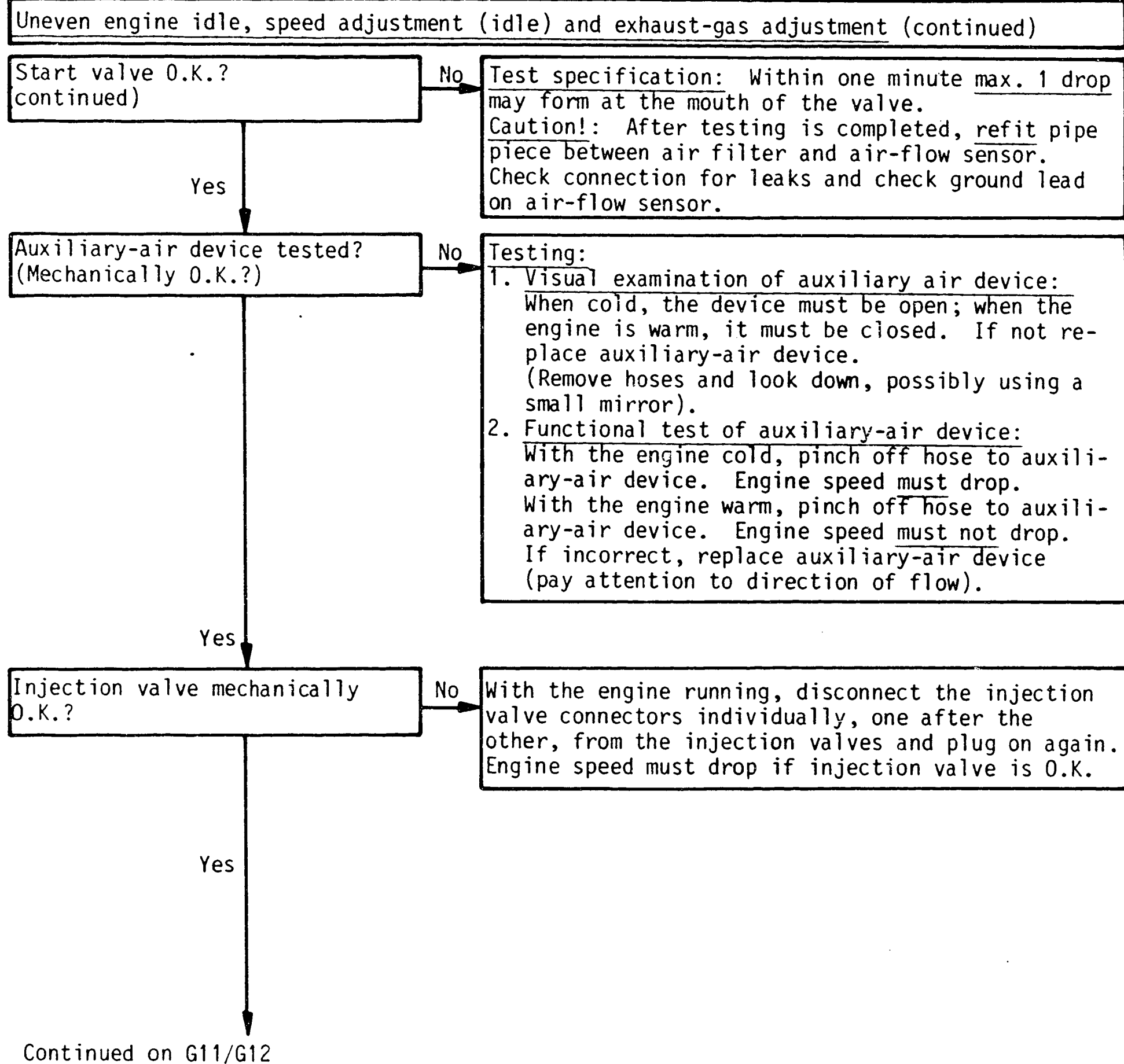
Uneven engine idle
BMW 745i Turbo



G8

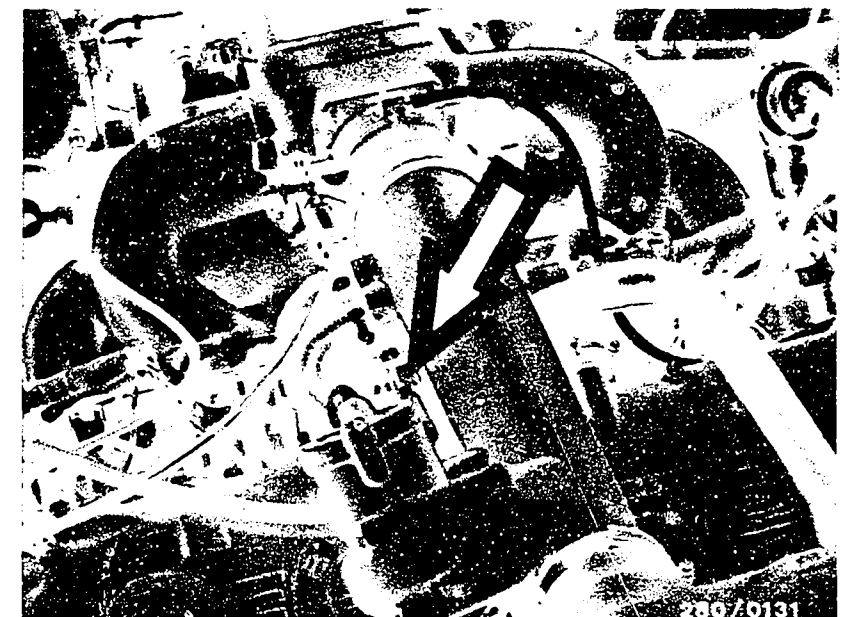
Uneven engine idle
BMW 745i Turbo





1 = Start valve
2 = Thermo-time switch

Arrow = Auxiliary-air device



G9

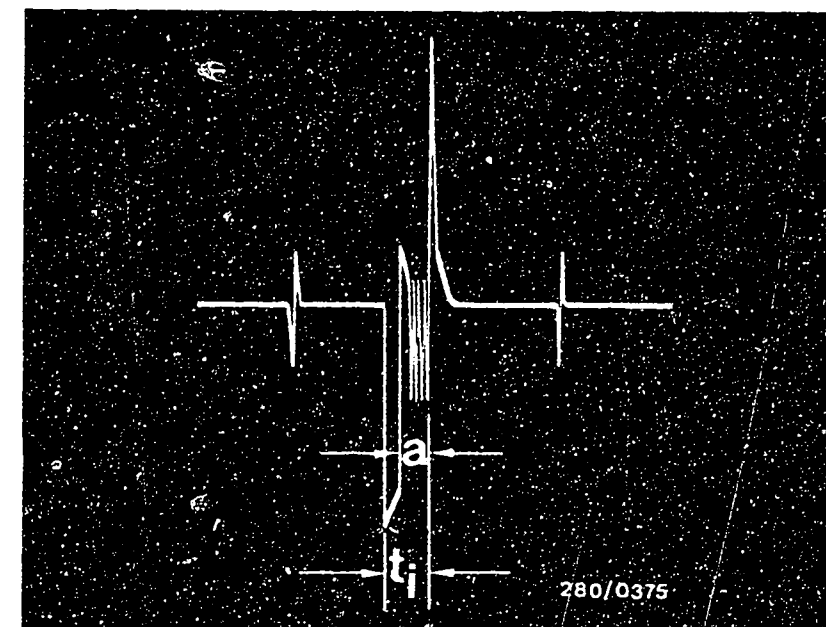
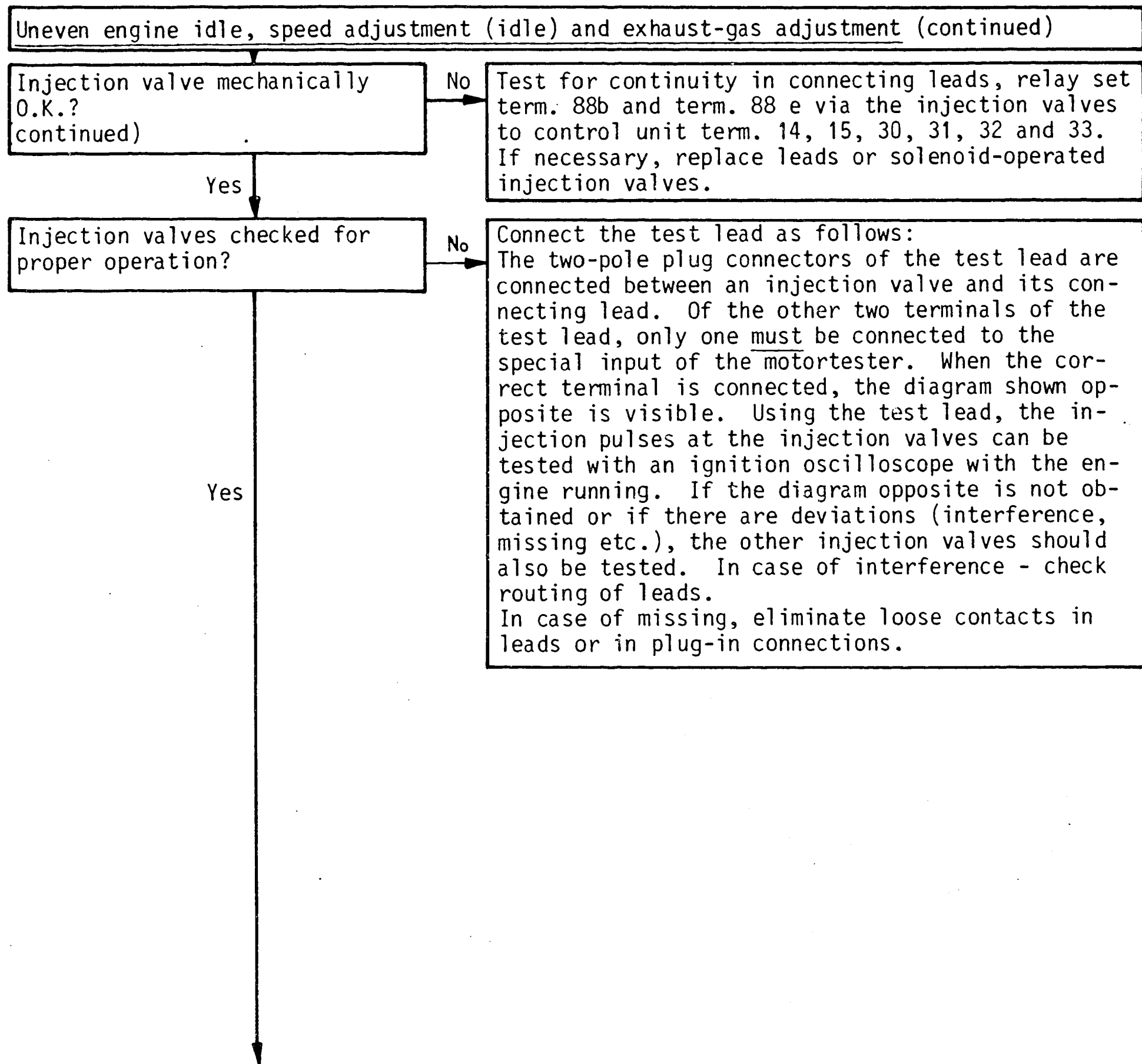
Uneven engine idle
BMW 745i Turbo



G10

Uneven engine idle
BMW 745i Turbo





Injection pulse of a current-regulated output stage.

(Measured at the injection valve)
a = Length of regulation (dependent on engine load).

t_i = Injection pulse

At idle with engine at no load the current regulation "a" is not yet visible on the oscilloscope.

Continued on G13/G14

G11

Uneven engine idle
BMW 745i Turbo



G12

Uneven engine idle
BMW 745i Turbo



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment
(continued)

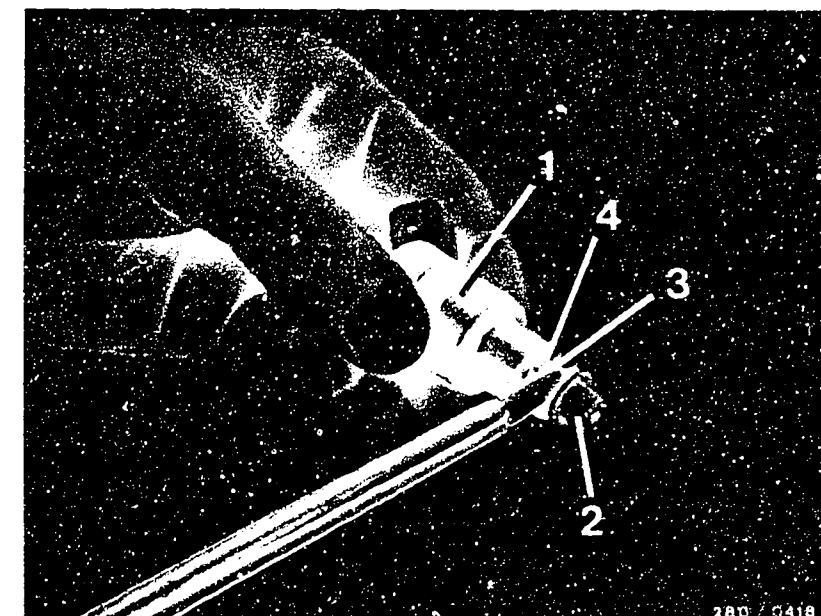
Repair solenoid-operated injection valves.
Protection sleeve or O-ring O.K.?

no

Replace protection sleeve or O-ring. Remove fuel-distribution pipe.
Remove electrical connection.
Carefully slide holding clamp out of groove and withdraw injection valve from fuel-distribution pipe.
Caution! Catch any escaping fuel. Do not allow to drip onto hot parts of the engine.
Carefully lever off protection sleeve (using screwdriver or similar).
Caution! Do not damage projecting injection valve needle. Lift off both O-rings and remove supporting plate.
Use parts set 1 287 010 704. Slip on supporting plate. Fit both O-rings and carefully press on new protection sleeve using a user-fabricated pipe-piece (approx. 120 mm long with an inside diameter of 10 mm). Do not damage injection valve needle. If the O-ring (fuel-distribution pipe connection) is swollen, it must also be replaced.

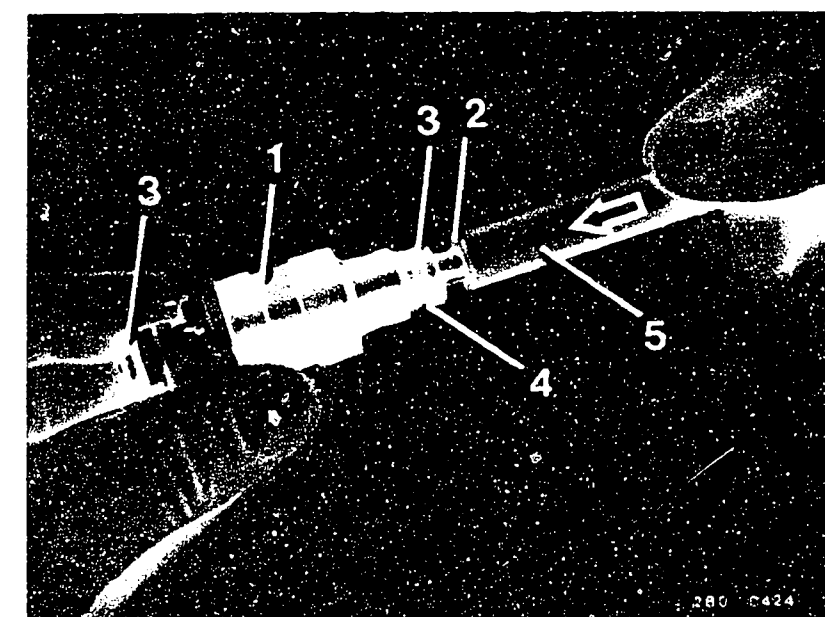
yes

Continued on G15/G16



- 1 = injection valve
- 2 = protection sleeve
- 3 = O-ring
- 4 = supporting plate

- 1 = injection valve
- 2 = new protection sleeve
- 3 = O-ring
- 4 = supporting plate
- 5 = pipe-piece



G13

Uneven engine idle
BMW 745i Turbo



G14

Uneven engine idle
BMW 745i Turbo



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment (Continued)

Air-flow sensor O.K.?

No

Testing:

Unscrew pipe piece between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor. Connect ohmmeter to term. 7 and term. 8 of air-flow sensor. Deflect air-flow sensor flap.

Measure resistance:

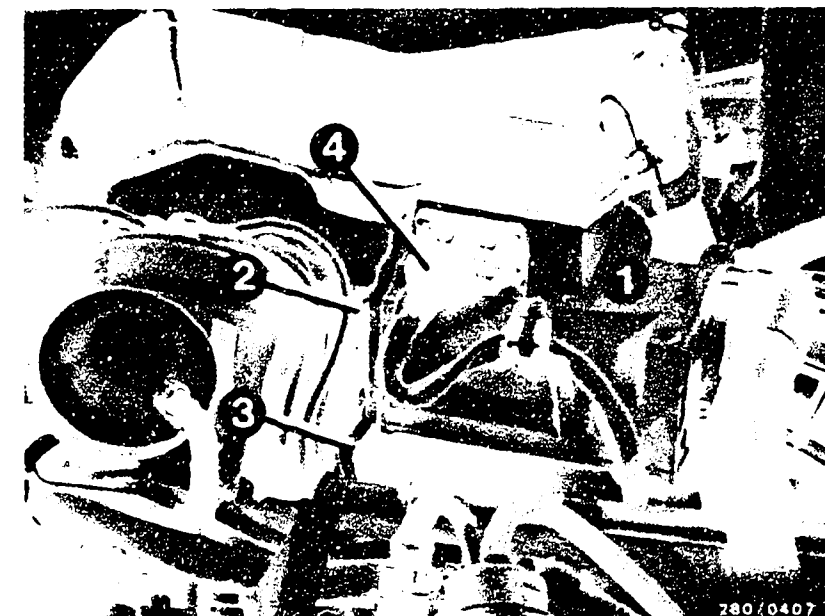
Test specification: 200...1000 Ω

Caution!

After testing is completed, refit pipe piece between air filter and air-flow sensor. Check connecting parts for leaks and check ground lead on air-flow sensor.

Yes

Continued on G 17/G 18



- 1=Air-flow sensor
- 2=Connecting screws for pipe piece
- 3=Ground lead
- 4=Plug

G 15

Uneven engine idle
BMW 745i Turbo



G 16

Uneven engine idle
BMW 745i Turbo



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment
(Continued)

Are all hose lines and electric leads securely attached?
Visual examination. Is the air-intake system leak-tight?

No

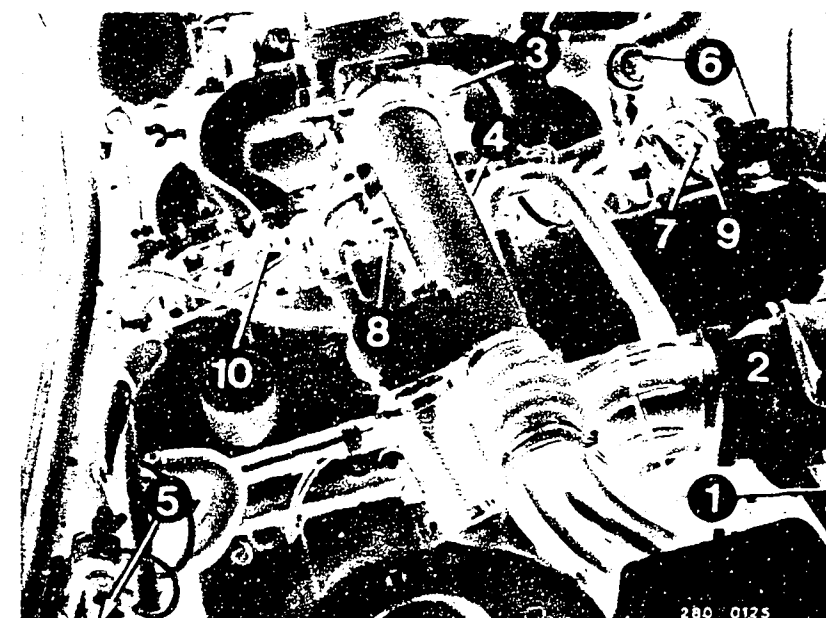
Check whether hoses of air-intake system and of fuel line system are securely attached, not kinked or damaged. If necessary, replace hoses. Eliminate leaks with new seals or by re-tightening the connecting screws.

Checking for leaks:

Seal off exhaust tail pipe. Screw off hose from air filter to air-flow sensor on air-flow sensor and seal off air-flow sensor duct. Pull off hose after auxiliary-air device and blow air (0.3 bar) into the intake manifold with a compressed-air gun. Seal off connection port on auxiliary-air device. Open throttle valve fully while doing this. Brush or spray all joints with soapy water. Bubbling or foaming indicates a leak.

Check electric contacts for loose connection.

Yes



- 1 = Air filter
- 2 = Air-flow sensor
- 3 = Throttle-valve switch
- 4 = Start valve (blue plug)
- 8 = Auxiliary-air device

Continued on G 19/G 20

G 17

Uneven engine idle
BMW 745i Turbo



G 18

Uneven engine idle
BMW 745i Turbo



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment (continued)

CO and idle speed correctly adjusted?

Yes

Testing completed for customer complaint

"Uneven engine idle"

Customer complaint remedied?

No

CO idle adjustment

Exhaust-gas test with CO analyzer with engine at normal operating temperature and at idle speed.

Idle speed

Manually-shifted transmission and automatic transmission (selector lever in position P):

800...900 min⁻¹

CO setting

81 model (ignition distributor No. 0 237 304 017):

0.5...2.0 % by vol. CO

82 model (ignition distributor No. 0 237 306 047):

Less than 1.5% by vol. CO.

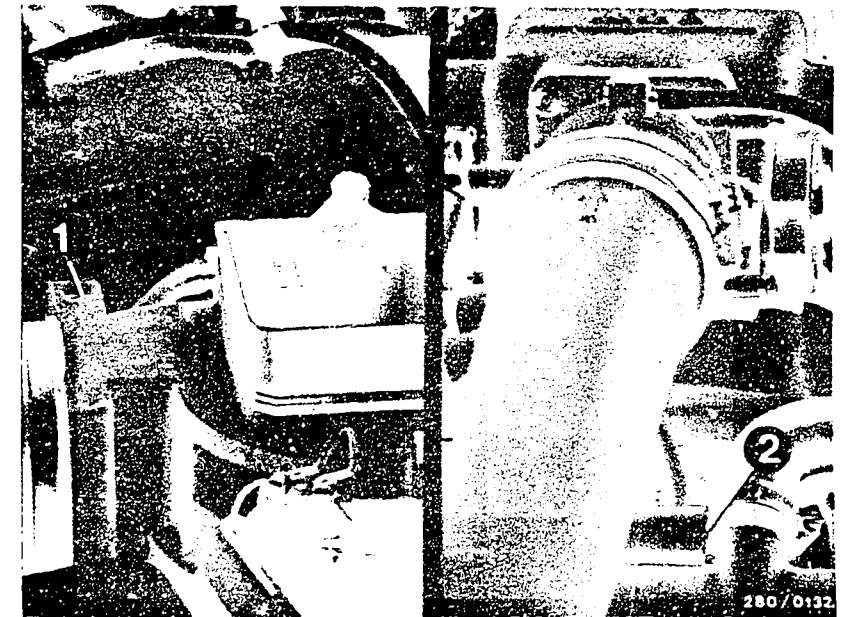
If CO concentration too high, turn bypass screw (CO adjusting screw) in air-flow sensor half a turn in a counterclockwise direction. Check engine speed and CO concentration again. Carry out adjustments in several steps. After adjusting, use new plugs.

No

Further possibilities:

Customer complaint incorrectly diagnosed (see Coordinates B3...B8). If the fault has not been detected by "Direct trouble-shooting"; see "Detailed trouble-shooting" (Coordinates B3/B4).

Engine not mechanically O.K.
(Compression, valve setting, valve timing, worn camshaft).



1 = CO adjusting screw

2 = Idle-speed adjusting screw

G 19

Uneven engine idle
BMW 745i Turbo



G 20

Uneven engine idle
BMW 745i Turbo



Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

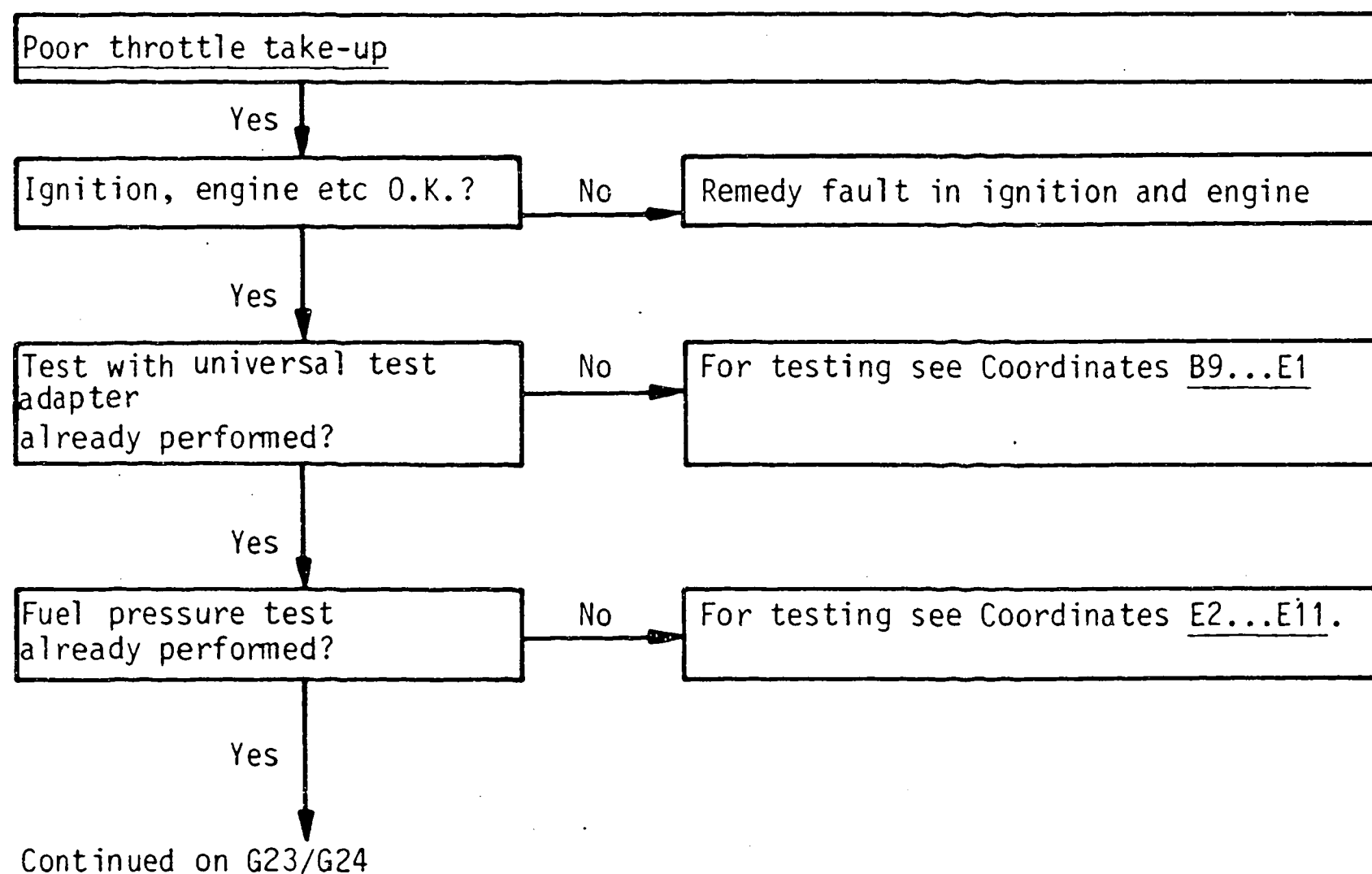
The program is divided into three rows of boxes:

1. The left-hand row contains the questions on the tests.
2. The middle row contains descriptions of the testing and adjustment operations on the components.
3. The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row and carry out the tests given there.

When you have finished testing, continue trouble-shooting at the point at which you branched off.



Poor throttle take-up (Continued)

Throttle valve closed?

No

Testing:

Throttle valve closed?

Check whether the throttle valve can be closed still further and whether the engine speed thereby drops.

Visual examination: Loosen hose clamp (5) and push back charge-air tube (4).

Setting the throttle-valve stop:

a) Throttle cable:

Throttle-plate lever at stop.

Screw in knurled nut on cable until only minimal play is left.

b) Bowden cable for automatic transmission:

In idle position, set the play "S" to 0.25... 0.75 mm.

Setting the throttle-valve switch:

Loosen fastening screws slightly. Connect ohmmeter to term. 2 and term. 18. Turn the throttle-valve switch to the right until the idle contact (microswitch) can be heard to click. (Reading 0 Ω). Checking the setting: Pull slightly on the throttle cable. The idle contact must be heard to click. (Reading $\infty\Omega$)

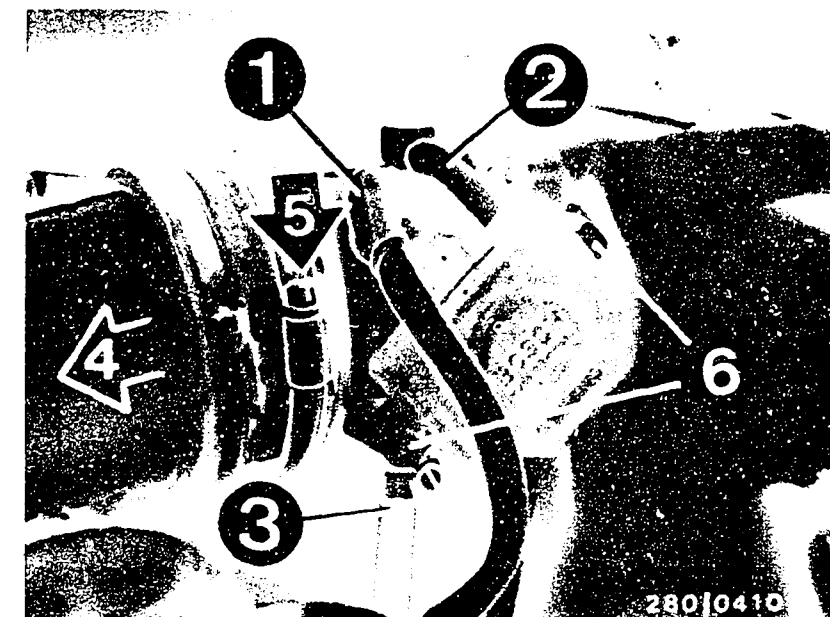
Trouble-shooting:

Check the following leads for continuity using ohmmeter (set value approx. 0 Ω):

From multiple plug term. 2 to throttle-valve switch term. 2. From throttle-valve switch term. 18 to multiple plug term. 18. Eliminate contact resistances in plug-in connections.

Yes

Continued on H 1/H 2



1=Throttle-valve switch

2=Vacuum hose to distributor retard unit

3=Vacuum hose to distributor advance unit

4=Charge-air tube

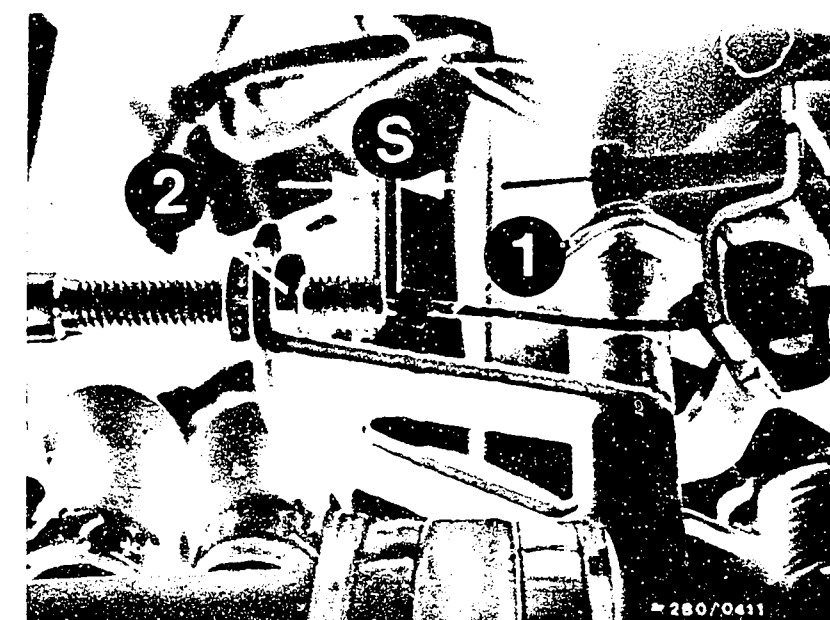
5=Hose clamp

6=Fastening screws

1=Throttle cable

2=Lock nut

3=Setting dimension



G23

Poor throttle take-up

BMW 745i Turbo



G24

Poor throttle take-up

BMW 745i Turbo



Poor throttle take-up (Continued)

Auxiliary-air device tested?
(Mechanically O.K.?)

No

Testing:

1. Visual examination of auxiliary air device:
When cold, the device must be open; when the engine is warm, it must be closed. If not, replace auxiliary-air device.
(Remove hoses and look down, possibly using a small mirror).
2. Functional test of auxiliary-air device:
With the engine cold, pinch off hose to auxiliary-air device. Engine speed must drop.
With the engine warm, pinch off hose to auxiliary-air device. Engine speed must not drop.
If incorrect, replace auxiliary-air device (pay attention to direction of flow).

Yes

Air-flow sensor O.K.?

No

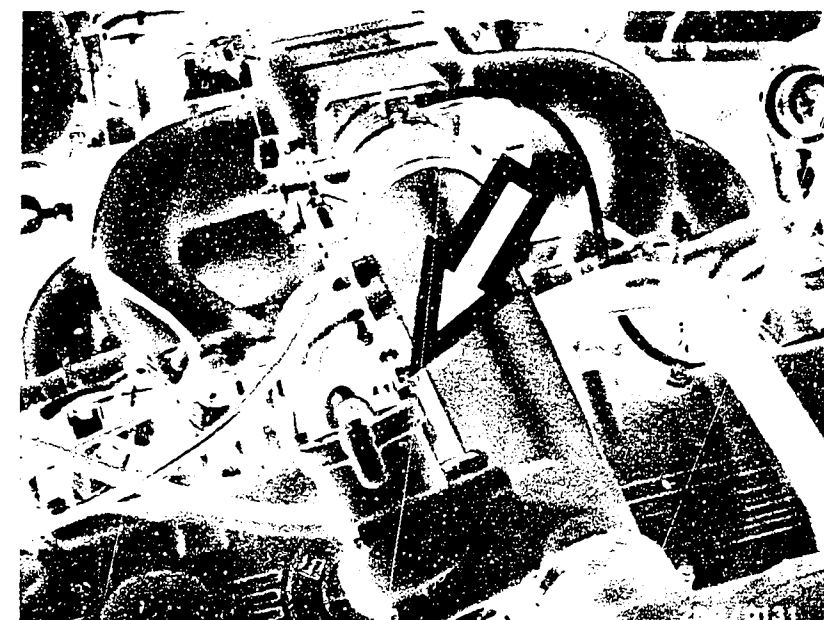
Testing:

Unscrew pipe piece between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor.

Yes

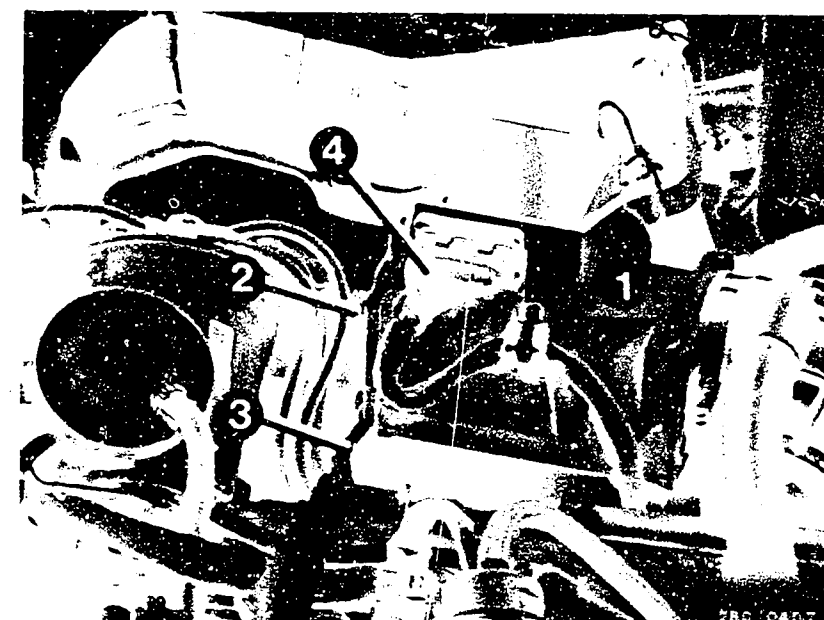
Yes

Continued on H 3/H 4



Arrow=Auxiliary-air device

- 1=Air-flow sensor
- 2=Connecting screws for pipe piece
- 3=Ground lead
- 4=Plug



H1

Poor throttle take-up
BMW 745i Turbo



H2

Poor throttle take-up
BMW 745i Turbo



Poor throttle take-up (continued)

Air-flow sensor O.K.?

No

Connect ohmmeter to term. 7 and term. 8 of air-flow sensor. Measure resistance. Deflect air-flow sensor flap.

Test specification: 200...1000 Ω

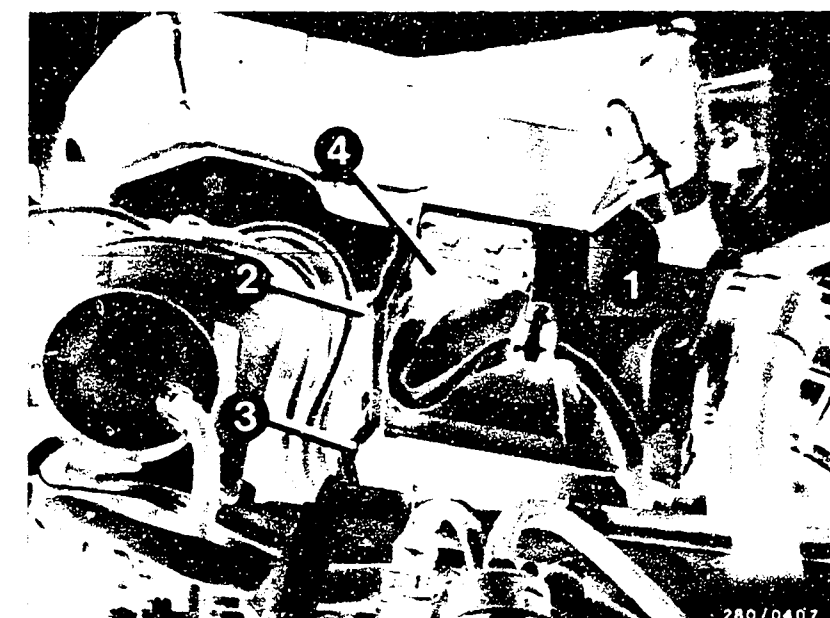
Potentiometer test: (Noise test)

Leave plug on. Set motortester to "Special input" and connect, using special cable, to air-flow sensor term. 7 (red clip) and term. 6 (black clip). Set control lever for image adjustment on motor-tester as far as it will go to the left (calibrated setting). Ignition "ON", deflect air-flow sensor flap suddenly (several times). If incorrect (see illustration) → Replace air-flow sensor. After testing, be sure to check the terminal lugs for security.

Caution!

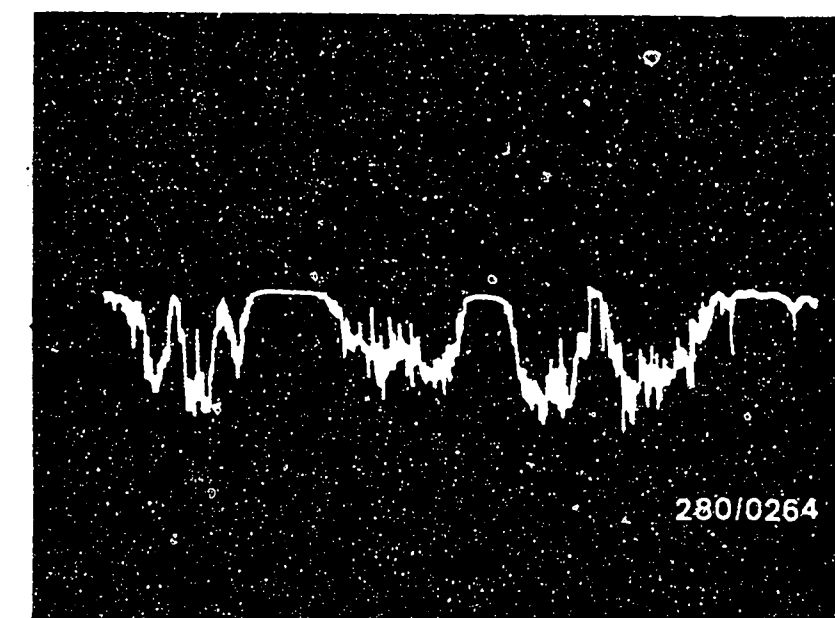
After testing is completed, refit pipe piece between air filter and air-flow sensor. Check connection for leaks and check ground lead on air-flow sensor.

Yes



- 1 = Air-flow sensor
- 2 = Connecting screws for pipe piece
- 3 = Ground lead
- 4 = Plug

Incorrect noise signal



Continued on H5/H6

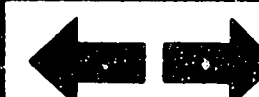
H3

Poor throttle take-up
BMW 745i Turbo



H4

Poor throttle take-up
BMW 745i Turbo



Poor throttle take-up (continued)

Are all hose lines and electric leads securely attached?
Visual examination. Is the air-intake system leak-tight?

No

Check whether hoses of air-intake system and of fuel line system are securely attached, not kinked or damaged. If necessary, replace hoses. Eliminate leaks with new seals or by re-tightening the connecting screws.

Checking for leaks:

Seal off exhaust tail pipe. Screw off hose from air filter to air-flow sensor on air-flow sensor and seal off air-flow sensor duct. Pull off hose after auxiliary-air device and blow air (0.3 bar) into the intake manifold with a compressed-air gun. Seal off connection port on auxiliary-air device. Open throttle valve fully while doing this. Brush or spray all joints with soapy water. Bubbling or foaming indicates a leak.

Check electric contacts for loose connection.

Yes

Continued on H 7/H 8

H5

Poor throttle take-up

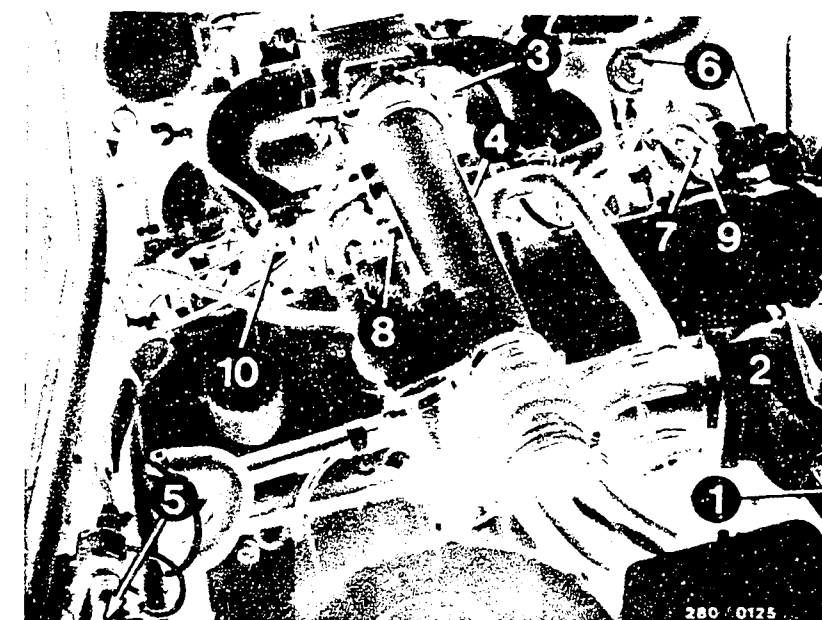
BMW 745i Turbo



H6

Poor throttle take-up

BMW 745i Turbo



- 1 = Air filter
- 2 = Air-flow sensor
- 3 = Throttle-valve switch
- 4 = Start valve (blue plug)
- 8 = Auxiliary-air device

Poor throttle take-up (Continued)

CO and idle speed correctly adjusted?

No

CO and idle adjustment

Exhaust-gas test with CO analyzer with engine at normal operating temperature and at idle speed
Idle speed

Manually-shifted transmission,
automatic transmission
(selector lever in
position P):

800...900 min⁻¹

CO setting

81 model

(Ignition distributor No.
0 237 304 017):

0.5...2.0% by vol. CO

82 model

(Ignition distributor No.
0 237 306 047):

Less than 1.5% by vol.
CO

If CO concentration too high, turn bypass screw (CO adjusting screw) in air-flow sensor half a turn in a counterclockwise direction. Check engine speed and CO concentration again. Carry out adjustments in several steps. After adjusting, use new plugs.

Yes

Can engine speed not be adjusted?

Yes

Testing completed for customer complaint

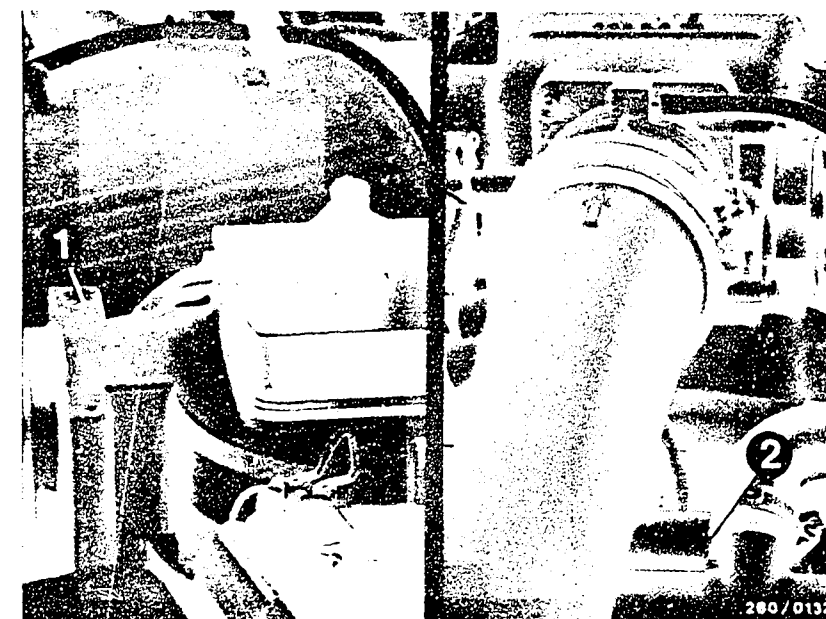
"Poor throttle take-up"

Customer complaint remedied?

No

Further possibilities:

- Customer complaint incorrectly diagnosed (see Coordinates B 3...B 8).
If the fault has not been detected by "Direct trouble-shooting", see "Detailed trouble-shooting" (Coordinates B3/B4).
- Engine not mechanically O.K.
(Compression, valve setting, valve timing, worn camshaft).



1=CO adjusting screw

2=Idle-speed-adjusting screw

H7

Poor throttle take-up

BMW 745i Turbo



H8

Poor throttle take-up

BMW 745i Turbo



Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

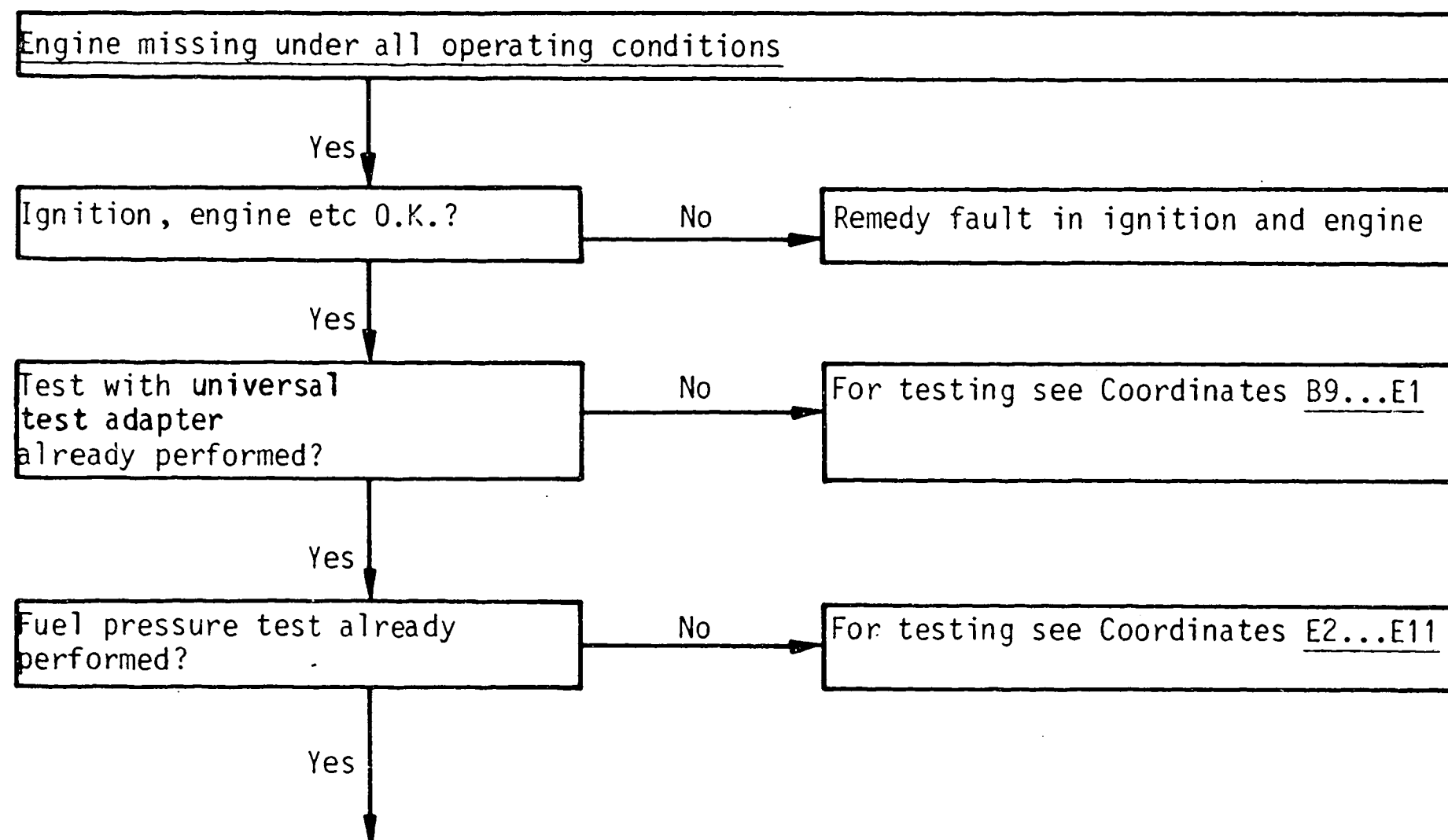
The program is divided into three rows of boxes:

1. The left-hand row contains the questions on the tests.
2. The middle row contains descriptions of the testing and adjustment operations on the components.
3. The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the question can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row and carry out the tests given there.

When you have finished testing, continue trouble-shooting at the point at which you branched off.



Continued on H11/H12

H9

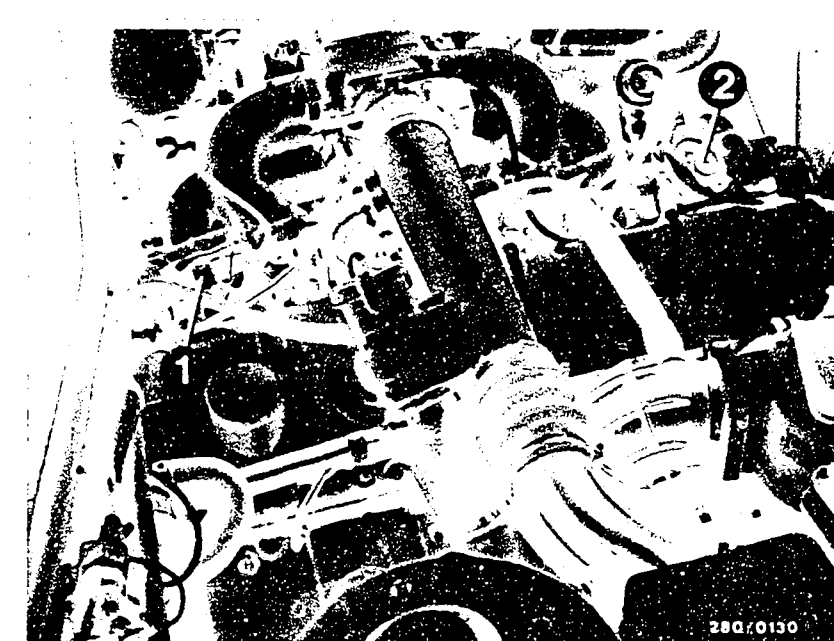
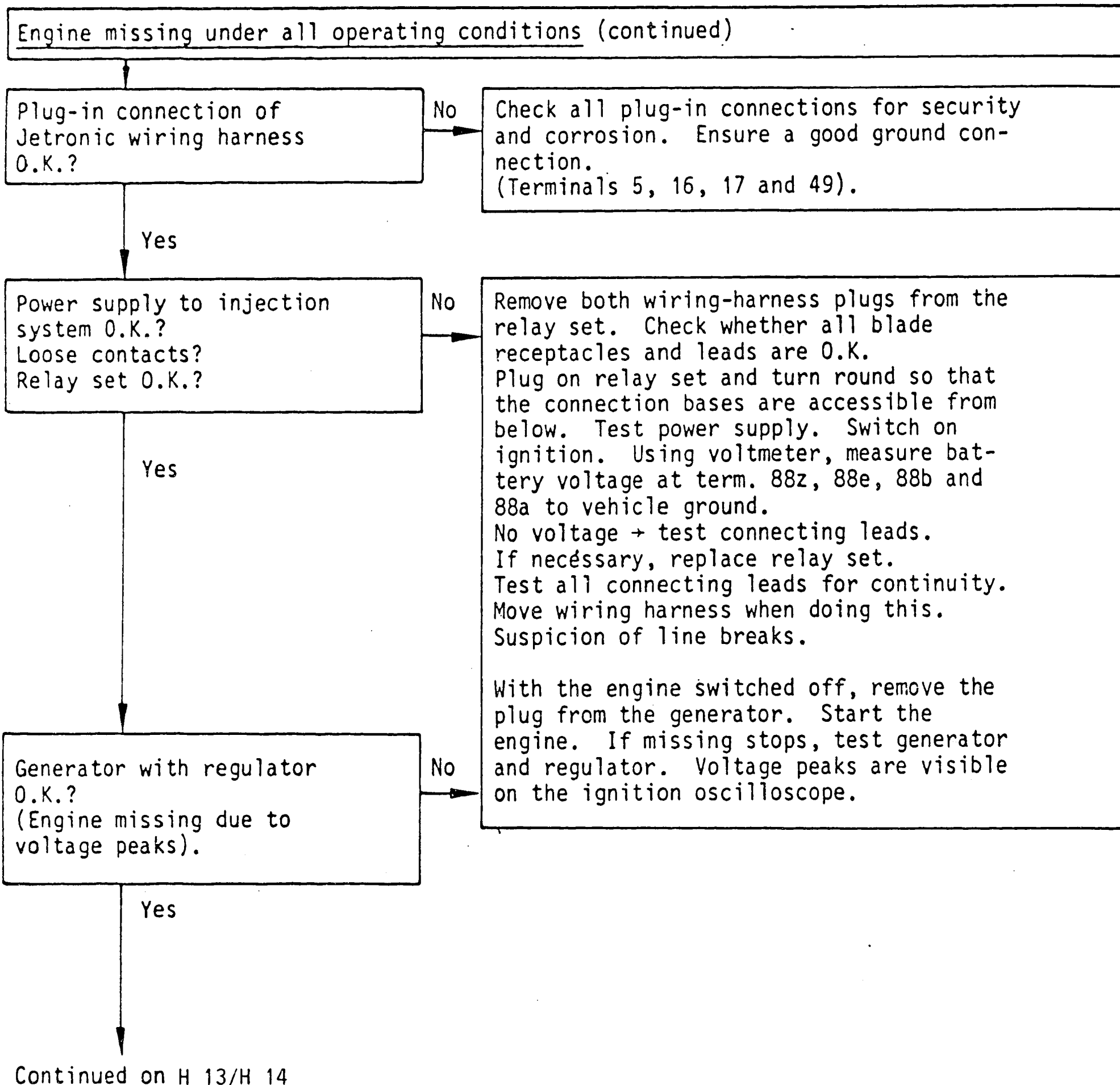
Engine missing under all op. conditions
BMW 745i Turbo



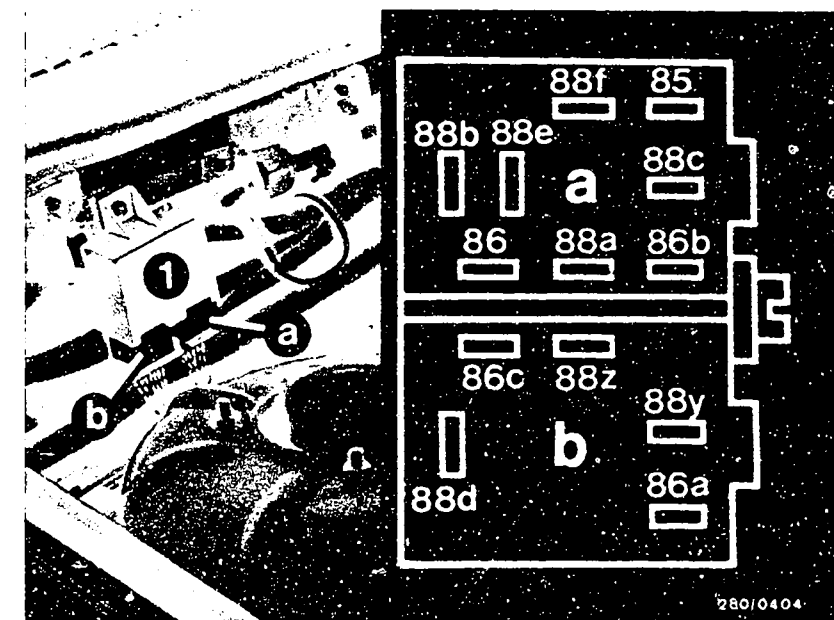
H10

Engine missing under all op. conditions
BMW 745i Turbo





- 1 = Central ground
- 1 = Relay set
- a = Jetronic wiring harness
- b = Vehicle wiring harness
(seen looking onto connection base from below)



Engine missing under all operating conditions (continued)

Solenoid operated injection valves checked for proper operation?

no

Connect test lead as follows:

The two-pole plug connectors of the test lead are connected between an injection valve and its connecting lead.

Of the other two terminals of the test lead, only one must be connected to the special input of the motortester.

When the correct terminal is connected, the oscilloscope pattern shown opposite is visible.

Using the test lead, the injection pulses at the injection valves can be tested with an ignition oscilloscope with the engine running.

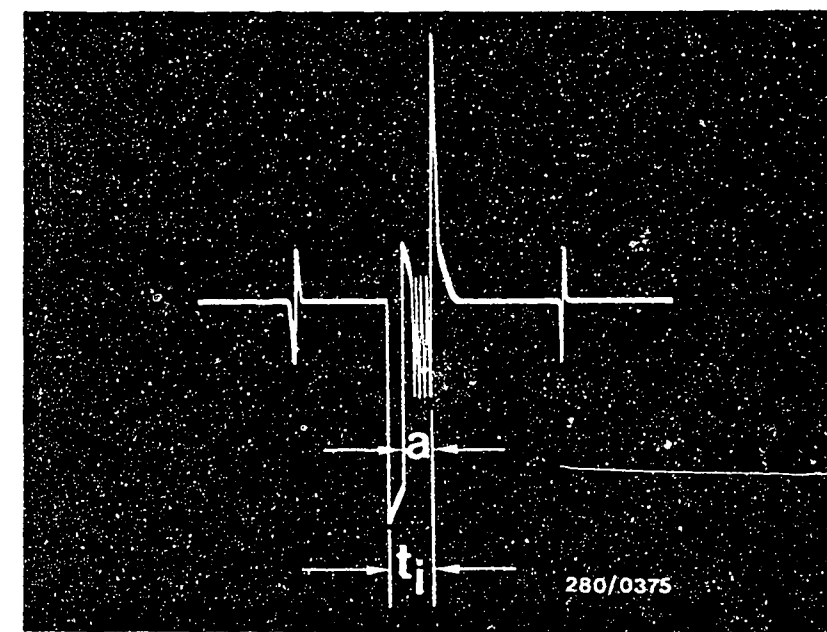
If the oscilloscope pattern opposite is not obtained or if there are deviations (interference, missing etc.), the other injection valves should also be tested.

In case of interference → check routing of leads.

In case of missing → eliminate loose contacts in leads or in plug-in connections.

yes

Continued on H15/H16



Injection pulse of current-regulated output stage (measured at the injection valve).

a = length of regulation (dependent on engine load)

t_j = injection pulse

At idle with engine at no load "a" is not yet visible on the oscilloscope

H13

Engine missing under all op. conditions
BMW 745i Turbo



H14

Engine missing under all op. conditions
BMW 745i Turbo



Engine missing under all operating conditions (continued)

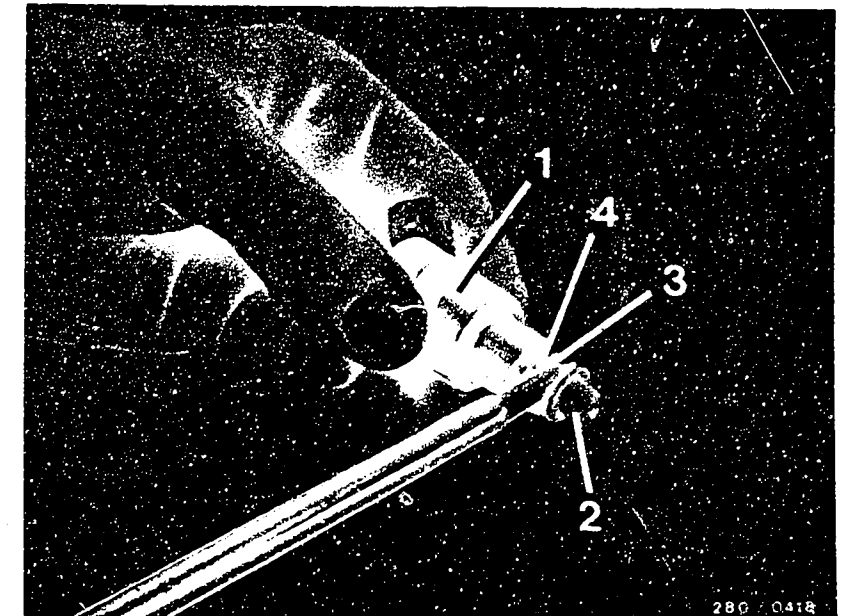
Repair solenoid-operated injection valves.
Protection sleeve or O-ring O.K.?

no

Replace protection sleeve or O-ring. Remove fuel-distribution pipe.
Remove electrical connection.
Carefully slide holding clamp out of groove and withdraw injection valve from fuel-distribution pipe.
Caution! Catch any escaping fuel. Do not allow to drip onto hot parts of the engine.
Carefully lever off protection sleeve (using screwdriver or similar).
Caution! Do not damage projecting injection valve needle. Lift off both O-rings and remove supporting plate.
Use parts set 1 287 010 704. Slip on supporting plate. Fit both O-rings and carefully press on new protection sleeve using a user-fabricated pipe-piece (approx. 120 mm long with an inside diameter of 10 mm). Do not damage injection valve needle. If the O-ring (fuel-distribution pipe connection) is swollen, it must be also replaced.

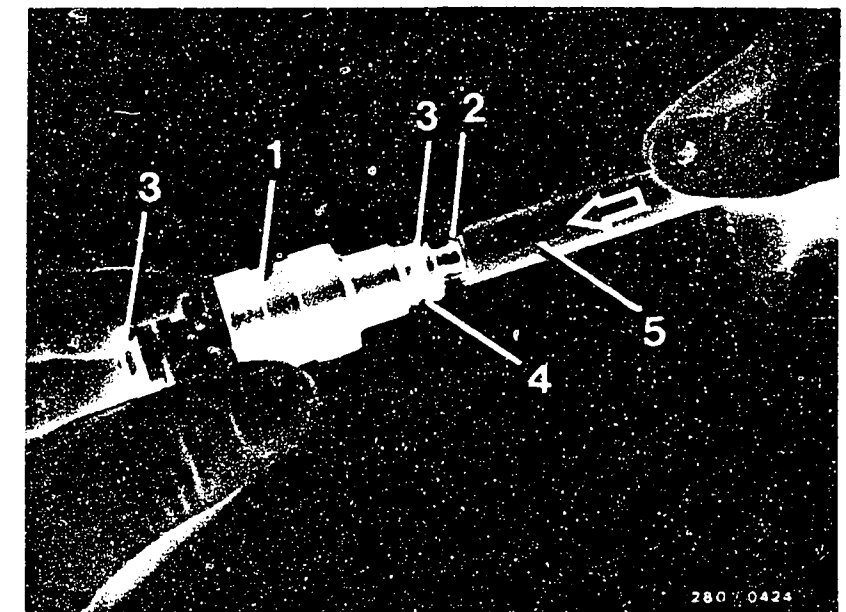
yes

Continued on H17/H18



- 1 = injection valve
- 2 = protection sleeve
- 3 = O-ring
- 4 = supporting plate

- 1 = injection valve
- 2 = new protection sleeve
- 3 = O-ring
- 4 = supporting plate
- 5 = pipe-piece



H 15

Engine missing under all op. conditions
BMW 745i Turbo



H 16

Engine missing under all op. conditions
BMW 745i Turbo



Engine missing under all operating conditions (Continued)

Air-flow sensor O.K.?

No

Yes

Testing:

Unscrew pipe piece between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor. Connect ohmmeter to term. 7 and term. 8 of air-flow sensor. Measure resistance.

Deflect air-flow sensor flap.

Test specification: 200...1000 Ω

Checking the pump contact:

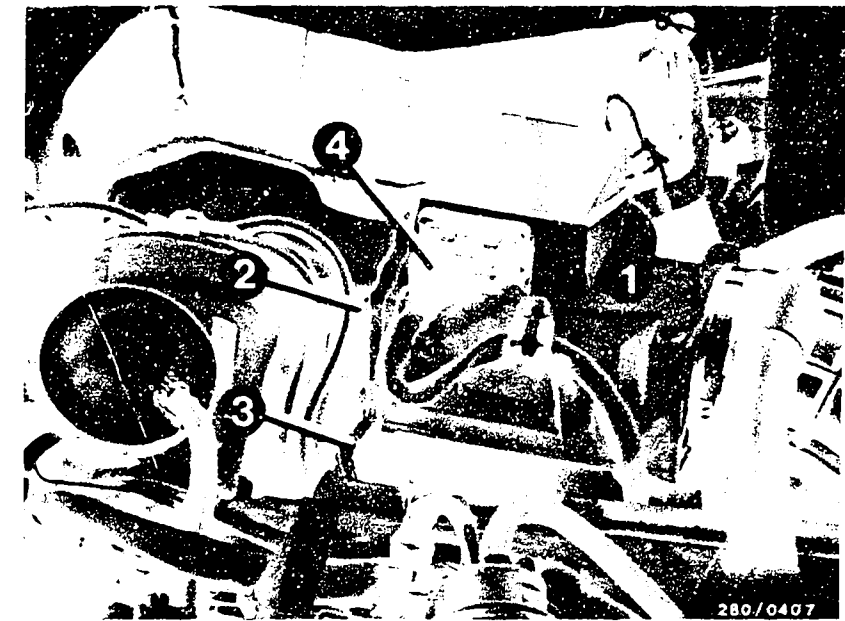
Remove plug from air-flow sensor. Using ohmmeter, measure resistance between term. 36 and term. 39:

Deflect air-flow sensor flap.

Set value approx. 0 Ω .

Potentiometer test: (Noise test)

Leave plug on. Set motortester to "Special input" and connect, using special cable, to air-flow sensor term. 7 (red clip) and term 6 (black clip). Set control lever for image adjustment on motortester as far as it will go to the left (calibrated setting). Ignition "On".



1=Air-flow sensor

2=Connecting screws for pipe piece

3=Ground lead

4=Plug

Continued on H 19/H 20

H17

Engine missing under all op. conditions

BMW 745i Turbo



H18

Engine missing under all op. conditions

BMW 745i Turbo



Engine missing under all operating conditions (continued)

Air-flow sensor O.K.? (continued)

No → Deflect air-flow sensor flap suddenly (several times).
If incorrect (see illustration) → Replace air-flow sensor. After testing be sure to check terminal lugs for security.

Stop engine while hot: Remove plug from air-flow sensor and connect ohmmeter to term. 6 and term. 36. Positive pole of ohmmeter to term. 6: approx 0 Ω. With reversed polarity: approx. ∞Ω.

Procedure if incorrect:

1. Air-flow sensor up to FD 040:
Replace air-flow sensor.
2. Air-flow sensor as of FD 041:
 - a) If necessary, eliminate faulty contact of plug-in connection 88 z, 86 c and 85 on the relay set.
 - b) Pump contact bent.

Checking the CO adjustment:

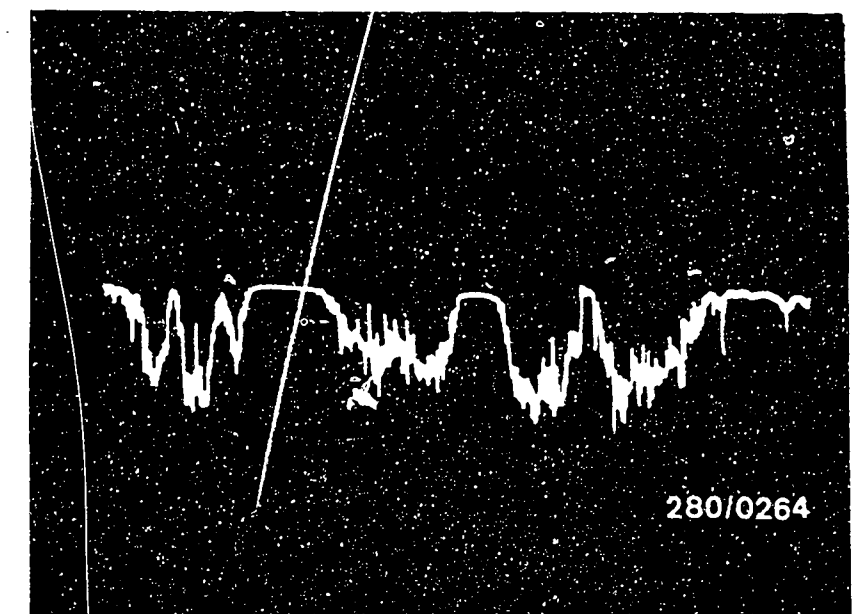
81 model (ignition distributor No. 0 237 304 017):
0.5...2.0% by vol. CO

82 model (ignition distributor No. 0 237 306 047):
Less than 1.5% by vol. CO

Idle adjustment: 800...900 min⁻¹
Check engine inlet valves (valve clearance too tight).

If the air-flow sensor is completely O.K. apart from the pump contact, it is possible to proceed as follows:
(See installation diagrams opposite).

Yes

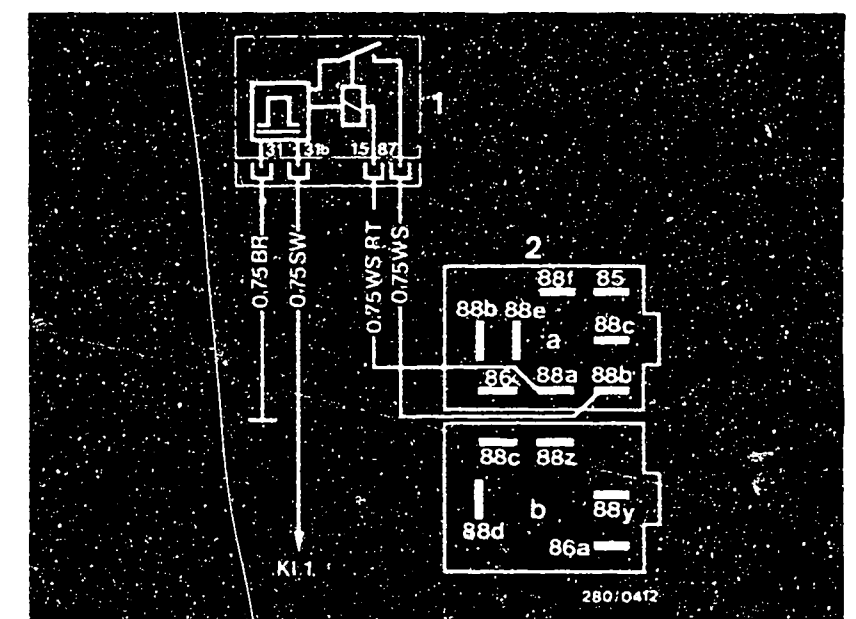


Incorrect noise signal

1 = Fuel pump relay
Striebel Co. (89 64 60)

2 = Relay set
Connection base viewed from below

a = Jetronic wiring harness
b = Vehicle wiring harness
Wiring harness for user-fabrication



Continued on H21/H22

H19

Engine missing under all op. conditions
BMW 745i Turbo



H20

Engine missing under all op. conditions
BMW 745i Turbo



Air-flow sensor O.K.?
(Continued)

Air-flow sensor O.K.?
(Continued)

No

Installation instructions:

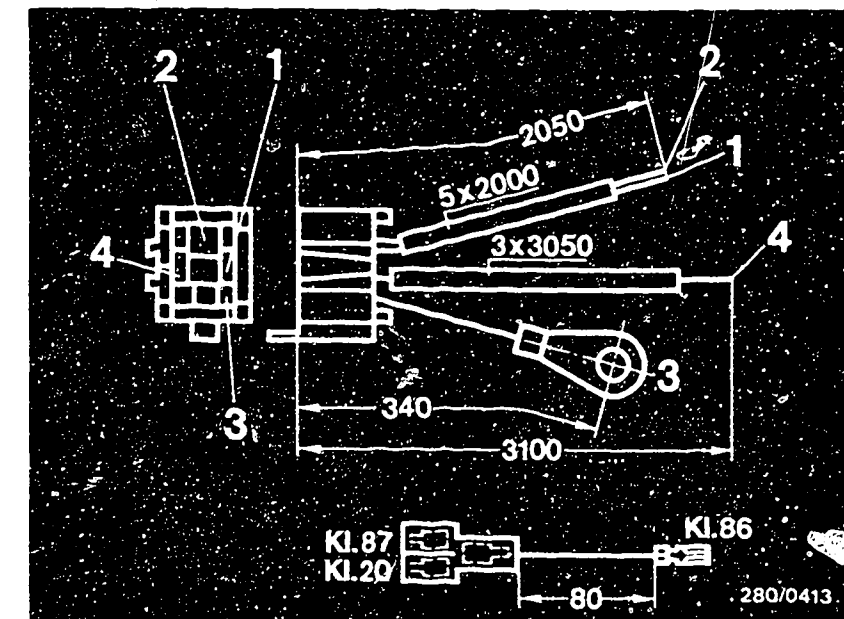
Plug the relay base for the fuel pump relay into the fuse box. Connect the brown lead of the user-fabricated wiring harness to the ground point (at front on fuse box). Remove the relay set. Run the white and red/white leads of the user-fabricated wiring harness along the Jetronic wiring harness to the relay set and connect to relay set in accordance with circuit diagram. Run the black lead of the user-fabricated wiring harness along the Jetronic wiring harness as far as the relay set and from there along the windshield washer hose to the ignition coil. Connect lead to ignition coil term. 1.

Caution!

After testing is completed, refit pipe piece between air filter and air-flow sensor. Check connection for leaks and check ground lead on air-flow sensor.

Yes

Continued on H 23/H 24



- ① Fuel pump relay term. 15 to relay set term. 88a (0.75mm² colour white/red)
- ② Fuel pump relay term. 87 to distributor term. 87 (0.75 mm² colour white)
- ③ Fuel pump relay term. 31 to ground (0.75 mm² colour brown)
- ④ Fuel pump relay term. 31b to ignition coil term. 1 (0.75 mm² colour black)
- ⑤ Distributor
Term. 87 to fuel pump relay and term. 20 to control unit. Term. 86b to relay set



Engine missing under all operating conditions (Continued)

Fuel delivery O.K.?

No

Measuring the fuel delivery:

For testing, undo the junction between the fuel return hose (from pressure regulator) and fuel return line (to fuel tank). If necessary, extend hose and lead into a 5 l vessel with graduated scale.

Remove pipe piece between air-flow sensor and air filter. Ignition "ON", open air-flow sensor flap by hand until pump operates.

Test specification: $\text{Min. } 1050 \text{ cm}^3/30 \text{ s}$

Remedy if test specification not reached:

- Fuel filter clogged → Replace
- Voltage at fuel pump plugs, with engine running, min. 12 V. If not, clean contacts; possibly eliminate poor ground connection or replace leads.

- Fuel pressure regulator defective → Replace.

- Check the pre-supply pump

Check by listening:

Remove plugs from electric fuel pump. Ignition "ON", open air-flow sensor flap by hand.

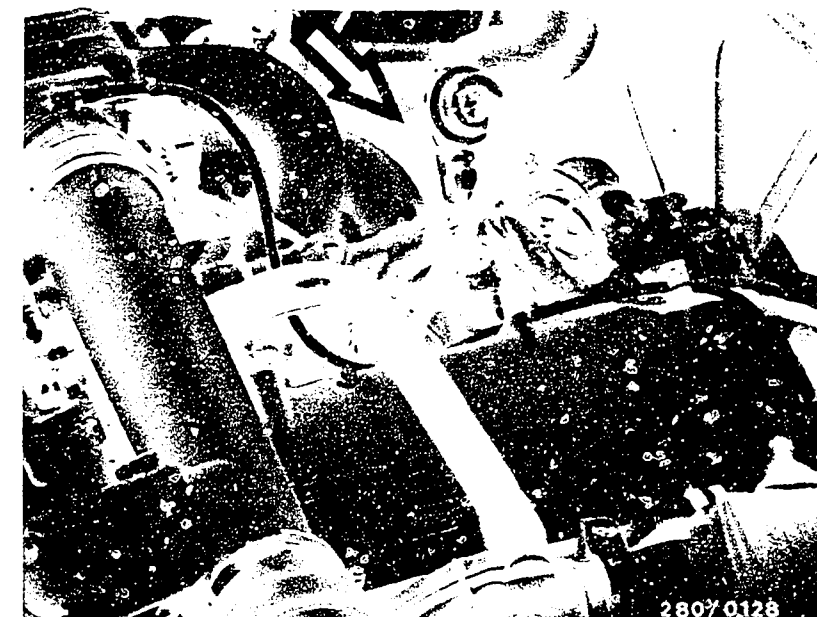
Pre-supply pump must operate.

If not, check connecting leads and, if necessary, replace pre-supply pump.

Yes

Yes

Continued on J 1/J 2



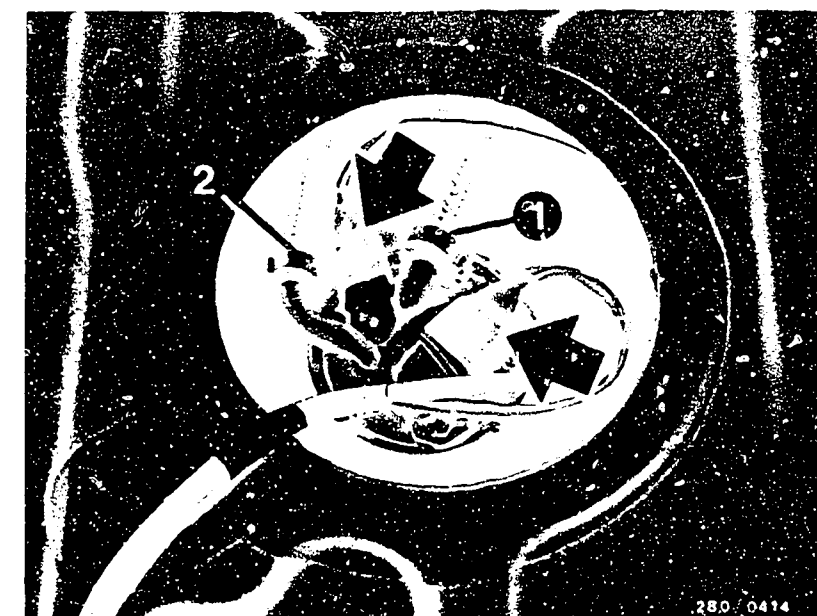
Arrow=Fuel return line

Pre-supply pump installed under mat in luggage compartment

1=Fuel delivery line to electric fuel pump

2=Fuel return line

Arrows=Plugs: 2-pole=Pre-supply pump, 3-pole=Dip-tube sender



H23

Engine missing under all op. conditions

BMW 745i Turbo



H24

Engine missing under all op. conditions

BMW 745i Turbo



Engine missing under all operating conditions (Continued)

Fuel delivery O.K.?
(Continued)

No

- Fuel pump delivery too low → Replace fuel pump.

After testing is completed, refit pipe piece between air filter and air-flow sensor. Check connection for leaks and check ground lead on air-flow sensor.

Yes

Control unit O.K.?

No

Let engine run. Shake control unit lightly and move multiple plug. Watch for engine missing. Repair plug-in connection on multiple plug or replace defective control unit.

Yes

Burbling on the overrun?
Throttle valve closed?
CO and idle adjustment O.K.?

No

1. Check the exhaust system for leaks.
2. Throttle valve closed?
Check whether the throttle valve can be closed still further and whether the engine speed thereby drops.
Visual examination:
Loosen the hose clamp and push back the charge-air tube.

Yes

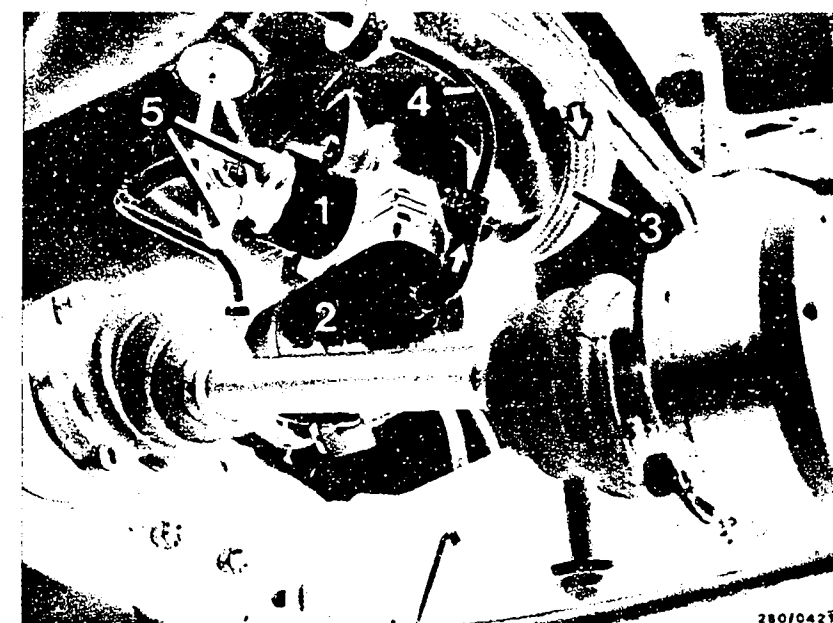
Adjusting the throttle-valve stop:

a) Throttle cable:

Throttle-plate lever at stop. Screw in the knurled nut on the cable until only minimal play is left.

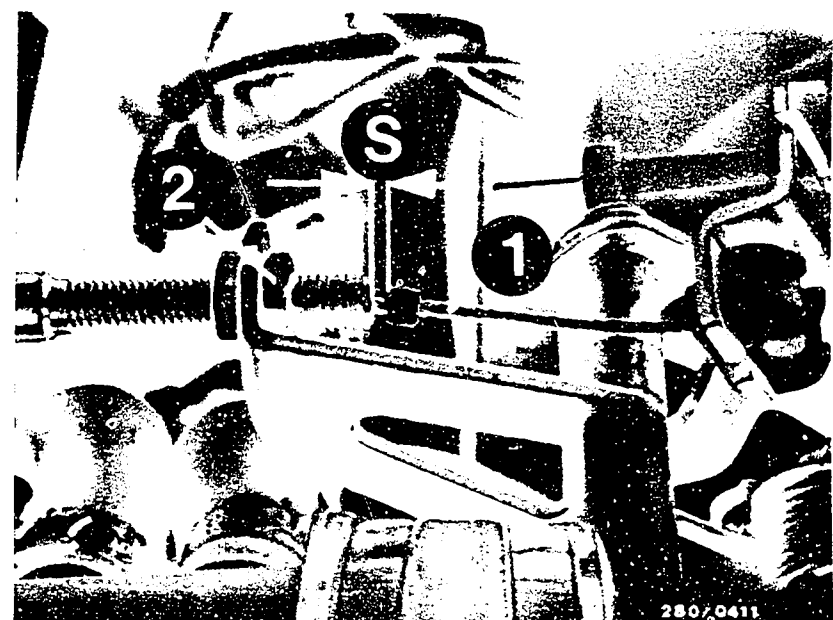
b) Bowden cable for automatic transmission:

In idle position, set the play "S" to 0.25 ...0.75 mm.



- 1=Fuel pump
- 2=Fuel filter
- 3=Fuel intake line
- 4=Fuel delivery line
- 5=Electric fuel pump plug
- Arrow=Direction of fuel flow

- 1=Throttle cable
- 2=Lock nut
- S=Setting dimension



Continued on J 3/J 4

J1

Engine missing under all op. conditions
BMW 745i Turbo



J2

Engine missing under all op. conditions
BMW 745i Turbo



Engine missing under all operating conditions (continued)

Burbling on the overrun?
Throttle valve closed? CO and
idle adjustment O.K.?
(continued)

No

Adjusting the throttle-valve switch:

Loosen the fastening screws slightly. Connect ohmmeter to term. 2 and term. 18. Turn the throttle-valve switch to the right until the idle contact (microswitch) can be heard to click. (Reading 0Ω).

Checking the adjustment:

Pull slightly on the throttle cable. The idle contact must be heard to click (reading $\infty \Omega$).

Trouble-shooting:

Check the following leads for continuity using ohmmeter (set value approx. 0Ω).

From multiple plug term. 2 to throttle-valve switch term. 2.

From throttle-valve switch term. 18 to multiple plug term. 18.

Eliminate contact resistances in plug-in connections.

3. Testing the overrun cutoff using a motortester:

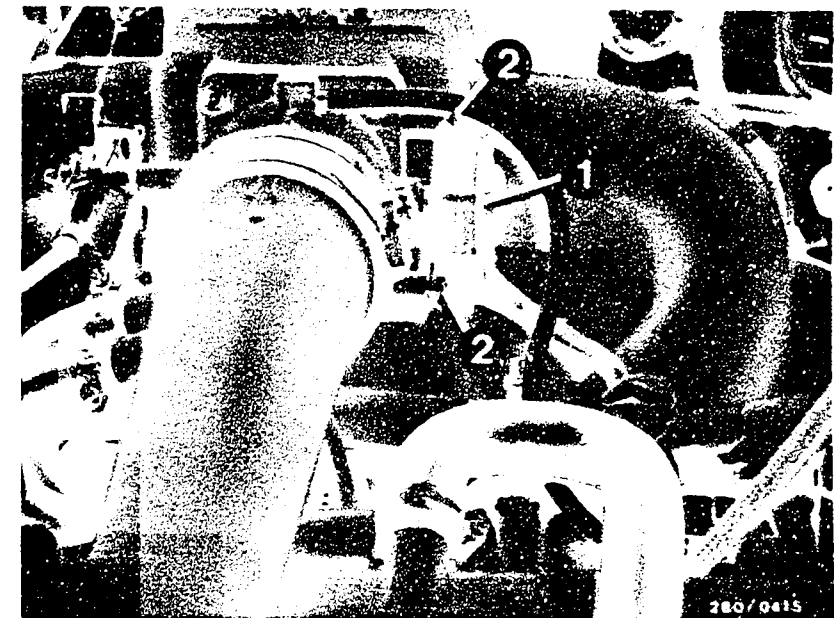
Connect the test lead as follows:

The two-pole plug connectors of the test lead are connected between an injection valve and its connecting lead. Of the other two terminals of the test lead, only one must be connected to the special input of the motortester. When the correct terminal is connected, the diagram shown opposite is visible.

Using the test lead, the injection pulses at the injection valves can be tested with an ignition oscilloscope with the engine running.

Yes

Continued on J5/J6



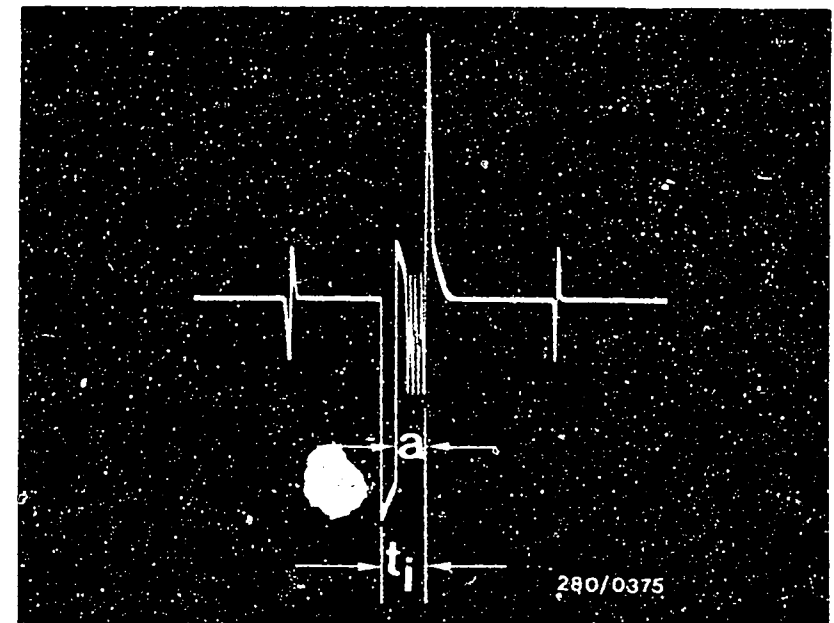
1 = Throttle-valve switch
2 = Fastening screws

Injection pulses of a current-regulated output stage.
(Measured at the injection valve)

a = Length of regulation

t_i = Injection pulse

At idle with engine at no load "a" is not yet visible on the oscilloscope



J3

Engine missing under all op. conditions
BMW 745i Turbo



J4

Engine missing under all op. conditions
BMW 745i Turbo



Engine missing under all operating conditions (continued)

Burbling on the overrun?
Throttle valve closed?
CO and idle adjustment O.K.?
(continued)

No

Testing:

Bring the warmed-up engine to 4000 min^{-1} and, using insulated wire, bridge term. 2 and term. 18 in the plug of the throttle-valve switch.

Engine at normal operating temperature (approx. $+80^{\circ}\text{C}$):

Down to approx. 1200 min^{-1} there must be no injection pulses.

Below approx. 1200 min^{-1} injection pulses must be present again.

If incorrect:

Test leads 2 and 18 for continuity using ohmmeter. Check switching of idle contact. If both O.K., replace control unit.

4. CO and idle adjustment

Exhaust-gas test with CO analyzer with engine at normal operating temperature and at idle speed.

Idle speed

Manually-shifted transmission,
automatic transmission

(selector lever in position P):

$800 \dots 900 \text{ min}^{-1}$

CO setting

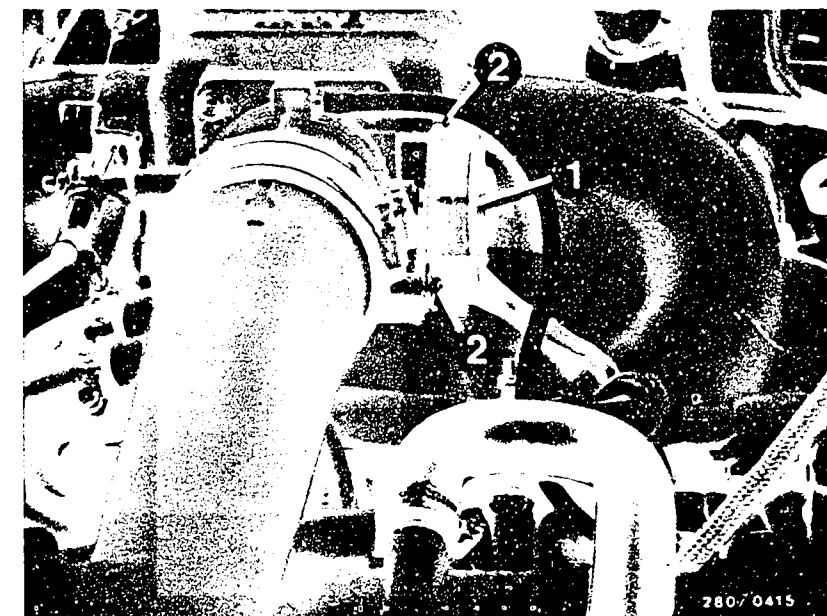
81 model (Ignition distributor No.
0 237 304 017): $0.5 \dots 2.0\%$ by vol CO

82 model (Ignition distributor No.
0 237 306 047): Less than 1.5% by vol CO

If CO concentration too high, turn bypass screw (CO adjusting screw) in air-flow sensor half a turn in a counterclockwise direction. Check engine speed and CO concentration again. Carry out adjustments in several steps. After adjusting, use new plugs.

Yes

Continued on J7/J8



1 = Throttle-valve switch
2 = Fastening screws

J5

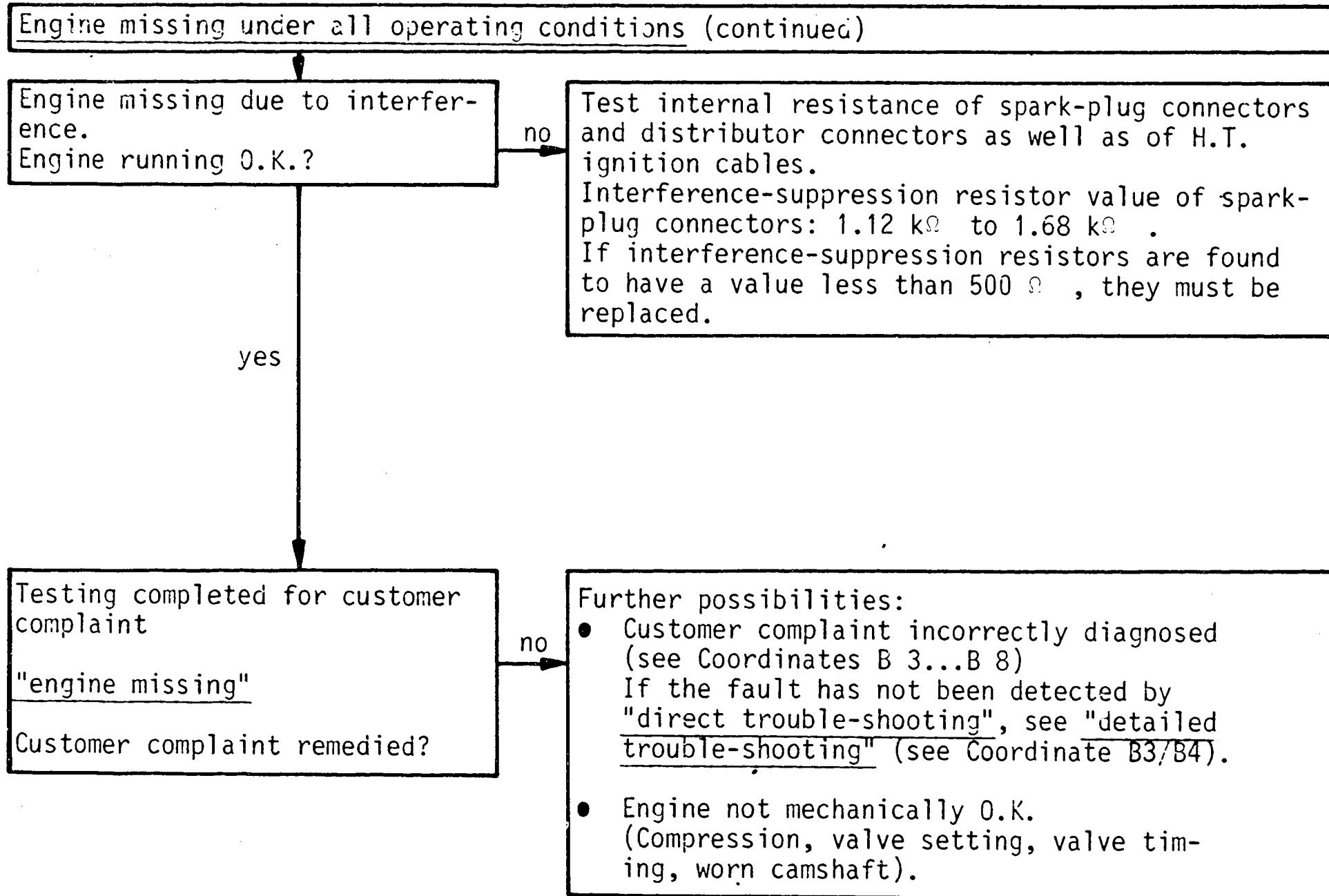
Engine missing under all op. conditions
BMW 745i Turbo



J6

Engine missing under all op. conditions
BMW 745i Turbo





Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

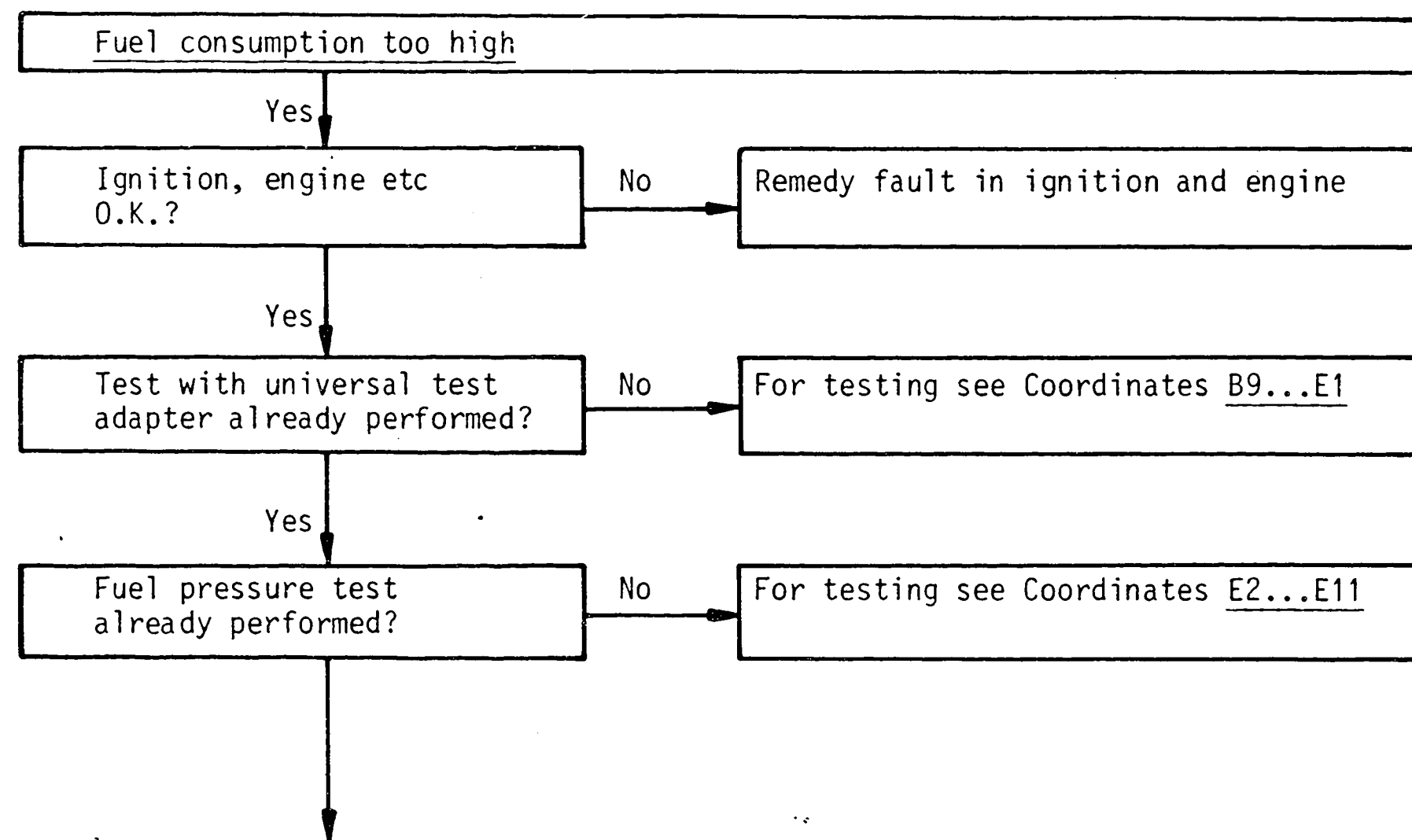
The program is divided into three rows of boxes:

1. The left-hand row contains the questions on the tests.
2. The middle row contains descriptions of the testing and adjustment operations on the components.
3. The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row and carry out the tests given there.

When you have finished testing, continue trouble-shooting at the point at which you branched off.



Continued on J11/J12

Fuel consumption too high (continued)

Have all brakes released fully?

Yes

Start valve O.K.?

No

Testing the start valve for leaks:

1. When installed

Pinch off the fuel delivery line to the start valve. If engine then runs smoothly, replace start valve.

2. When removed

Remove start valve (Caution! Fire hazard!). Fuel line and electric lead remain connected (place collector vessel under the start valve). Build up fuel pressure (unscrew pipe piece between air filter and air-flow sensor. Ignition "ON" and deflect air-flow sensor flap).

Test specification: Within one minute max. 1 drop may form at the mouth of the valve.

Caution!

After testing is completed, refit the pipe piece between air filter and air-flow sensor. Check connection for leaks and check ground connection (ground lead) on air-flow sensor.

Continued on J13/J14

J11

Fuel consumption too high
BMW 745i Turbo



J12

Fuel consumption too high
BMW 745i Turbo



Fuel consumption too high (continued)

Temperature sensors tested?

No

Testing:

Temperature sensor I measures the intake air temperature and is located in the air duct of the air-flow sensor. Measure the following values between term. 27 and term. 6 of air-flow sensor:

At ambient temperature
(approx. +15...+30°C): 1.45...3.3 k Ω

With engine at normal operating temperature
(approx. 80°C): 280...360 Ω

Make direct resistance measure at
temperature sensor II (engine) using ohmmeter.
Resistance measurement at term. 13 and term. 49
(ground):

At ambient temperature
(approx. +15...+30°C): 1.3...3.6 k Ω

With engine at normal operating temperature
(approx. 80°C): 250...390 Ω

If incorrect, check for open circuit or short
circuit in following leads using ohmmeter:

Temperature sensor I:

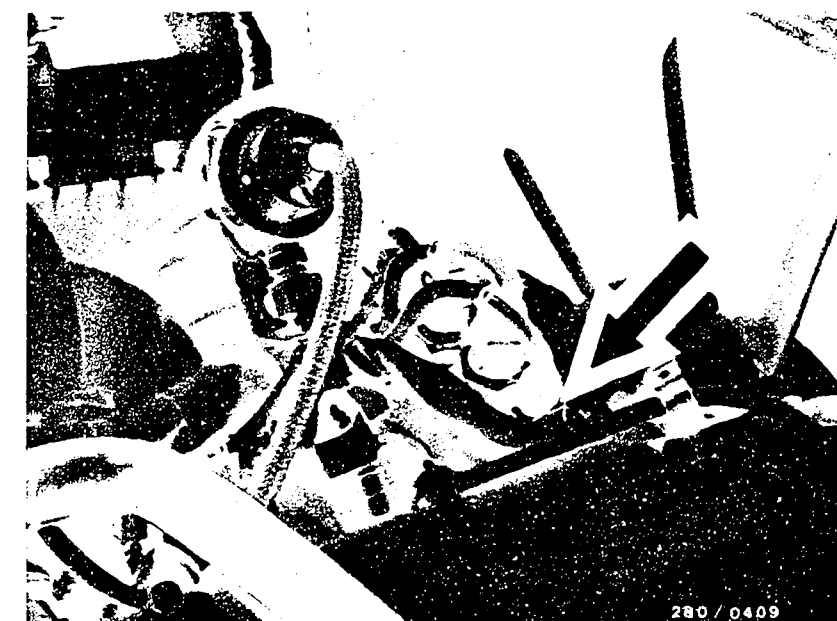
Multiple plug term. 27 to air-flow sensor
term. 27 and air-flow sensor term. 6 to
multiple plug term. 6.

Temperature sensor II:

Multiple plug term. 13 to temperature sensor
II term. 13 and temperature sensor II term.
49 to central ground (lead 49).

Check all contacts in the plug-in connections.

Yes



Arrow = Temperature sensor II
(engine) (white plug)

Continued on J15/J16

J13

Fuel consumption too high

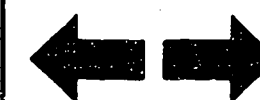
BMW 745i Turbo



J14

Fuel consumption too high

BMW 745i Turbo



Fuel consumption too high (continued)

Solenoid-operated injection valves mechanically O.K.?

no

With the engine running, disconnect the injection valve connectors individually, one after the other, from the injection valves and plug on again. Engine speed must drop if injection valve is O.K. Test for continuity in connecting leads of relay set term. 88b, term.38e via the injection valves to control unit term.14, 15, 30, 31, 32 and 33. If necessary, replace leads or solenoid-operated injection valves

yes

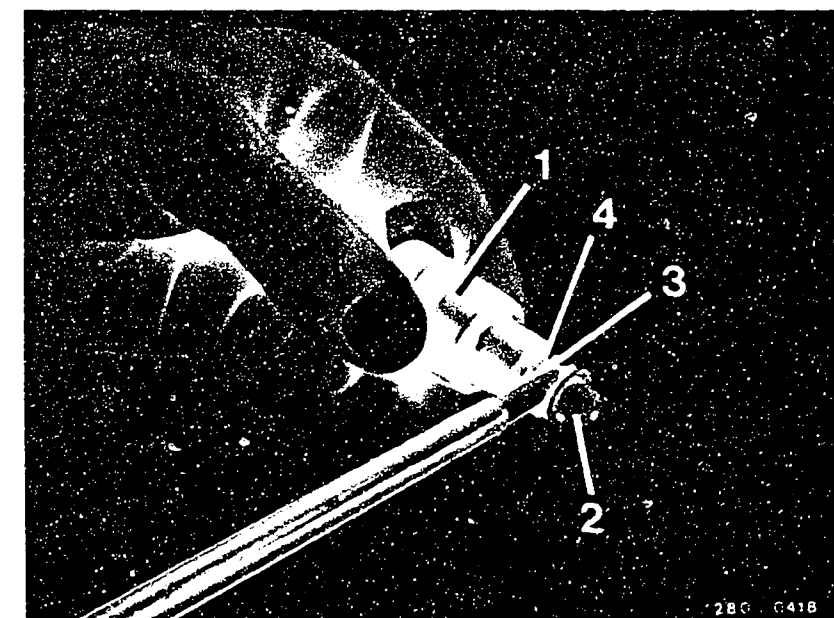
Repair solenoid-operated injection valves.
Protection sleeve or O-ring O.K.?

no

Replace protection sleeve or O-ring. Remove fuel-distribution pipe.
Remove electrical connection.
Carefully slide holding clamp out of groove and withdraw injection valve from fuel-distribution pipe.
Caution! Catch any escaping fuel. Do not allow to drip onto hot parts of the engine.
Carefully lever off protection sleeve (using screwdriver or similar).
Caution! Do not damage projecting injection valve needle. Lift off both O-rings and remove supporting plate.
Use parts set 1 287 010 704. Slip on supporting plate. Fit both O-rings and carefully press on new protection sleeve using a user-fabricated pipe-piece (approx. 120 mm long with an inside diameter of 10 mm). Do not damage injection valve needle. If the O-ring (fuel-distribution pipe connection) is swollen, it must also be replaced.

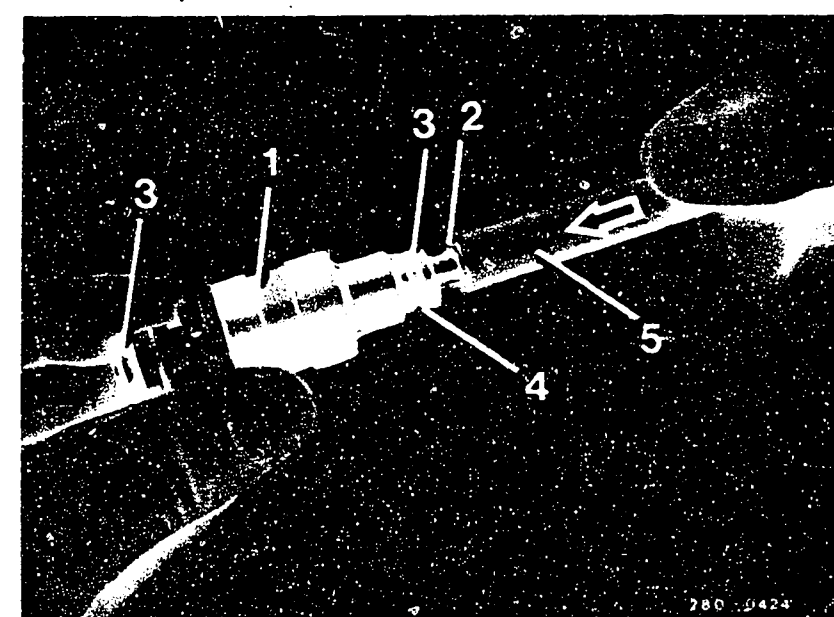
yes

Continued on J17/J18



- 1 = injection valve
- 2 = protection sleeve
- 3 = O-ring
- 4 = supporting plate

- 1 = injection valve
- 2 = new protection sleeve
- 3 = O-ring
- 4 = supporting plate
- 5 = pipe-piece



Fuel consumption too high (continued)

Air-flow sensor O.K.?

no

Testing:

Unscrew pipe-piece between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor.

Connect ohmmeter to term.7 and term.8 of air-flow sensor.

Measure resistance.

Deflect air-flow sensor flap.

Test specification:

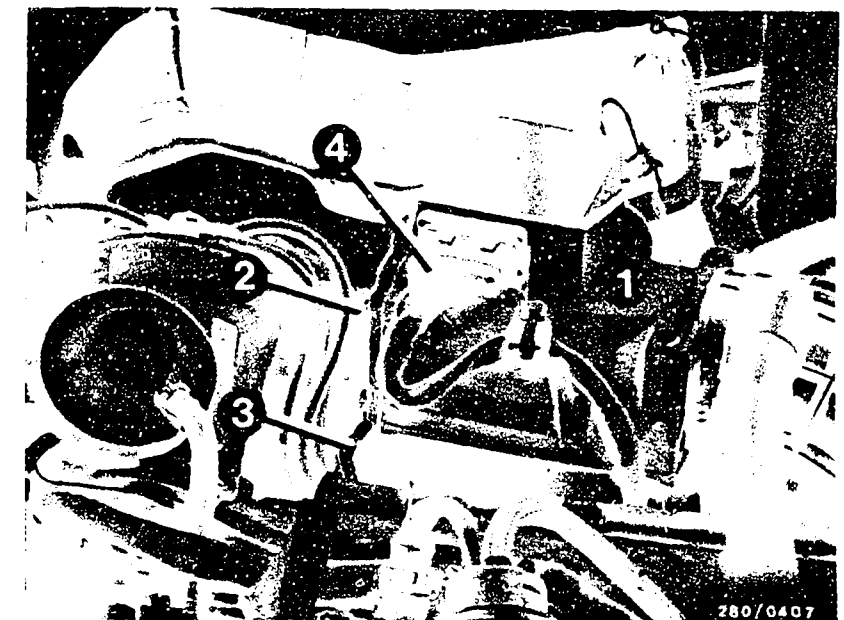
200...1000 Ω

Caution!

After testing is completed, refit the pipe-piece between air filter and air-flow sensor. Check for leaks and check the ground lead on the air-flow sensor.

yes

Continued on J19/J20



1 = air-flow sensor

2 = connecting screws for pipe-piece

3 = ground lead

4 = plug

J17

Fuel consumption too high

BMW 745i Turbo



J18

Fuel consumption too high

BMW 745i Turbo



Fuel consumption too high (continued)

CO and idle speed correctly adjusted?

No

CO and idle adjustment

Exhaust-gas test with CO analyzer with engine at normal operating temperature and at idle speed

Idle speed

Manually-shifted transmission, automatic transmission (selector lever in position P):

800...900 min⁻¹

CO setting

81 model

(Ignition distributor No.

0 237 304 017): 0.5...2.0% by vol. CO

82 model

(Ignition distributor No.

0 237 306 047): Less than 1.5% by vol. CO

If CO concentration too high, turn bypass screw (CO adjusting screw) in air-flow sensor half a turn in a counterclockwise direction. Check engine speed and CO concentration again. Carry out adjustments in several steps. After adjusting, use new plugs.

Can engine speed not be adjusted?

Yes

Yes

Testing completed for customer complaint

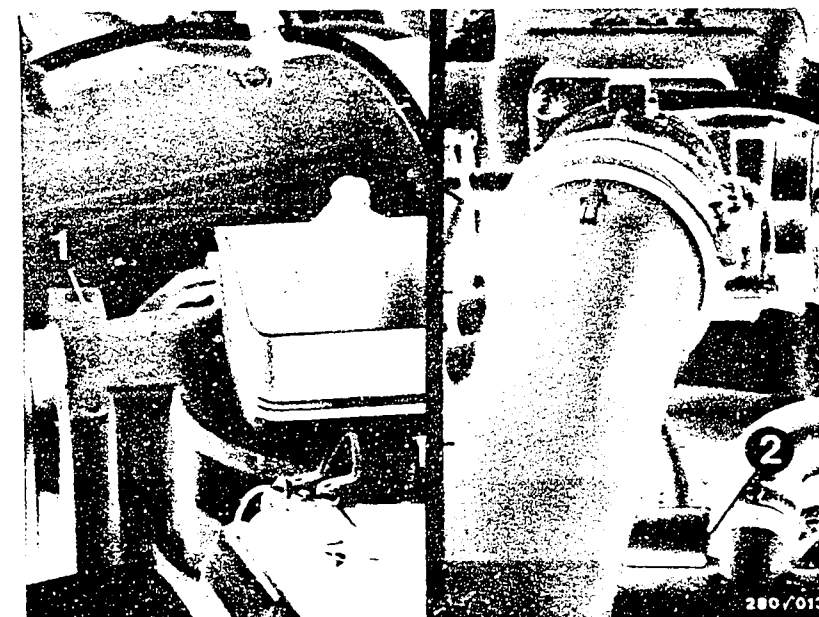
"Fuel consumption too high"

Customer complaint remedied?

No

Further possibilities:

- Customer complaint incorrectly diagnosed (See Coordinates B3...B8). If the fault has not been detected by "Direct trouble-shooting", see "Detailed trouble-shooting" (Coordinates B3/B4).
- Engine not mechanically O.K. (Compression, valve setting, valve timing, worn camshaft).



1 = CO adjusting screw

2 = Idle-speed-adjusting screw

J19

Fuel consumption too high

BMW 745i Turbo



J20

Fuel consumption too high

BMW 745i Turbo



Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

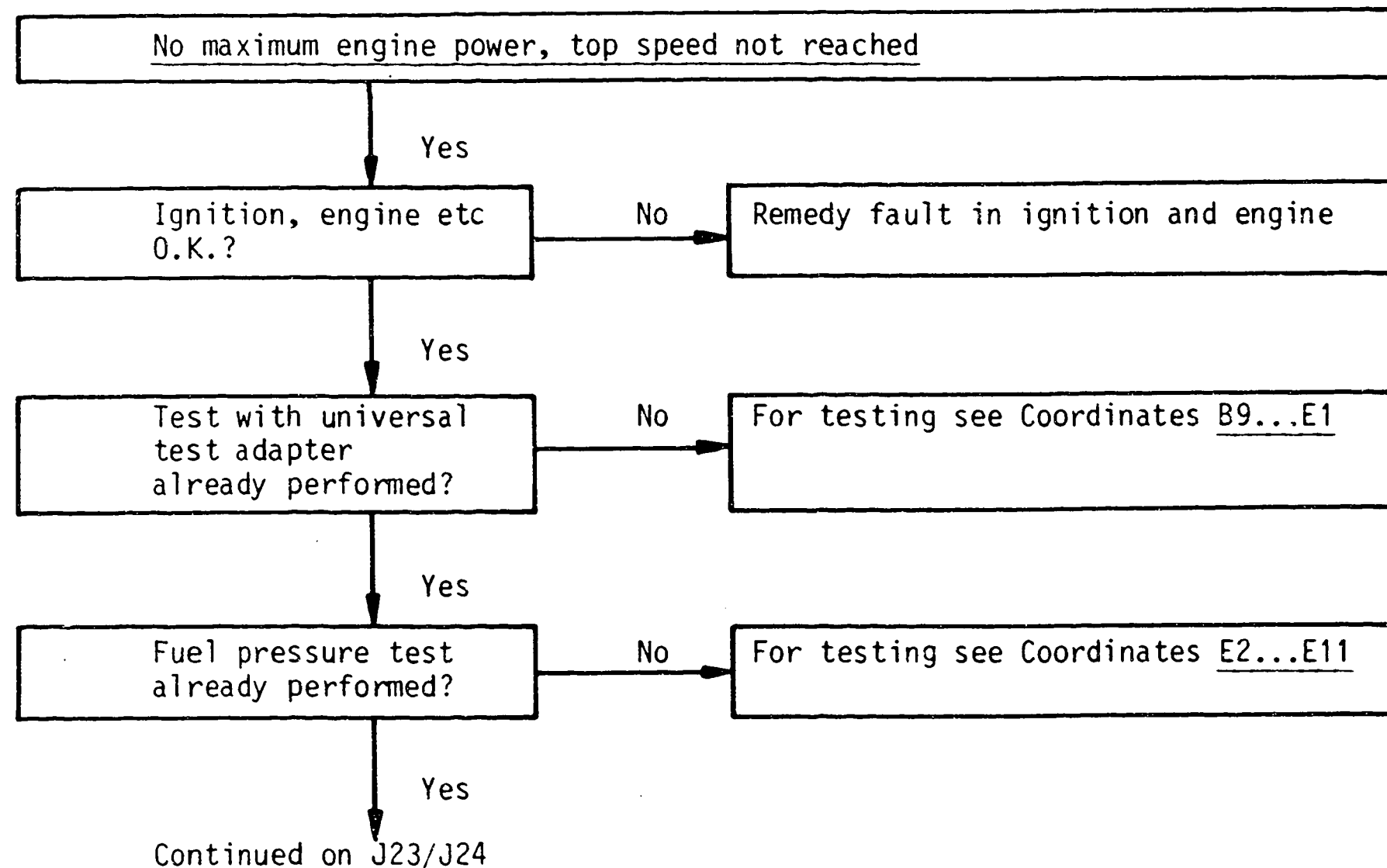
The program is divided into three rows of boxes:

1. The left-hand row contains the questions on the tests.
2. The middle row contains descriptions of the testing and adjustment operations on the components
3. The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row and carry out the tests given there.

When you have finished testing, continue trouble-shooting at the point at which you branched off.



J21

No maximum engine power

BMW 745i Turbo



J22

No maximum engine power

BMW 745i Turbo



No maximum engine power, top speed not reached (continued)

Throttle-valve switch O.K.?
(full-load enrichment)

no

Connect test lead as follows:

One terminal of the test lead is connected between an injection valve and its connecting lead. Of the other two terminals, only one must be connected to the special input of the motortester.

When the correct terminal is connected, the following oscilloscope pattern is visible.

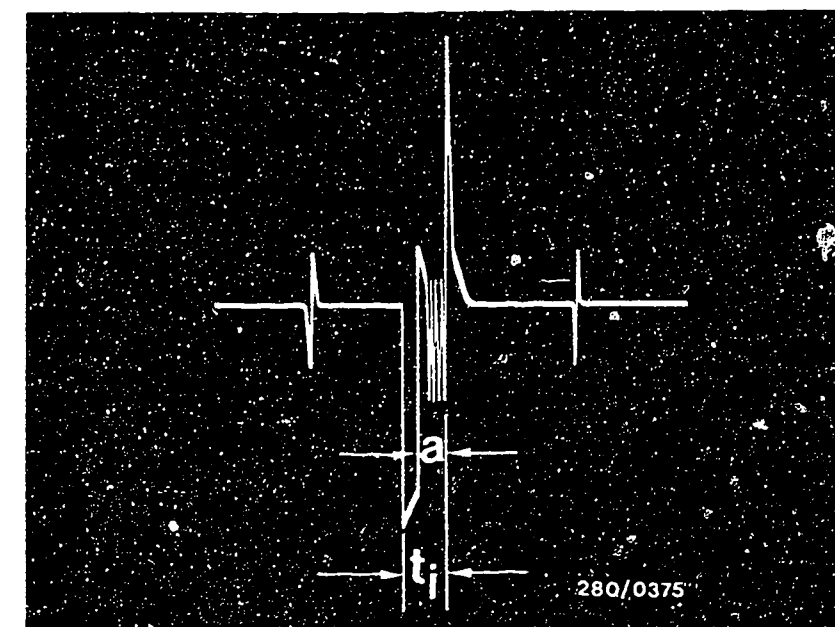
Using the test lead, the injection pulses at the injection valves can be tested with an ignition oscilloscope with the engine running.

Observe the injection pulses at idle. Remove the throttle-valve switch plug and bridge term.3 and term.18 (using insulated wire).

Caution! Do not bend terminals. Injection pulse must become longer. If not: test connecting leads from multiple plug to throttle-valve switch (term. 3 and term.18) for continuity. If O.K., replace control unit.

yes

Continued on K1/K2



Injection pulse of current-regulated output stage (measured at injection valve).

a = length of regulation

t_i = injection pulse

At idle with the engine at no load "a" is not yet visible on the oscilloscope

J23

No maximum engine power
BMW 745i Turbo



J24

No maximum engine power
BMW 745i Turbo



No maximum engine power, top speed not reached (continued)

Does throttle valve open fully?

No

Throttle linkage, accelerator pedal O.K.?
Straighten linkage if necessary. Throttle linkage may stick due to floor mat etc.
Check plug-in connection on throttle-valve switch, engine-speed switch and control unit.

Testing:

Open the throttle valve fully.
(Completely depress accelerator).
Connect ohmmeter to term. 3 and term. 18 on throttle-valve switch - set valve approx. 0 Ω .
If reading differs, replace throttle-valve switch.
Fault not remedied? Using ohmmeter, check the following leads for continuity (set value approx. 0 Ω):

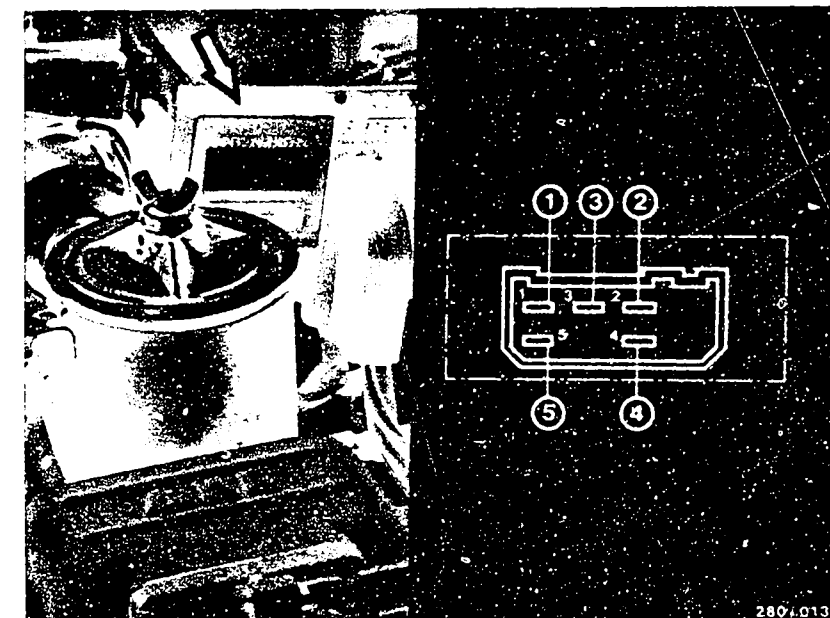
From throttle-valve switch term. 3 to control unit term. 3. From throttle-valve switch term. 18 to control unit term. 18.

Only on 82 model:

Remove the engine-speed relay and bridge term. 1 and term. 5 in the plug. Repeat the test. If test O.K., replace engine-speed relay. If not, check connecting leads for open circuit.

Yes

Continued on K3/K4



Arrow = Engine-speed switch

1 = To pressure switch

2 = To terminal 15

3 = To terminal 31

4 = To TCI trigger box term. 8

5 = To terminal 15

K1

No maximum engine power

BMW 745i Turbo



K2

No maximum engine power

BMW 745i Turbo



No maximum engine power, top speed not reached (Continued)

Fuel delivery O.K.?

No

Yes

Measuring the fuel delivery:

For testing, undo the junction between the fuel return hose (from pressure regulator) and fuel return line (to fuel tank). If necessary, extend hose and lead into a 5 l vessel with graduated scale.

Remove pipe piece between air-flow sensor and air filter. Ignition "ON", open air-flow sensor flap by hand until pump operates.

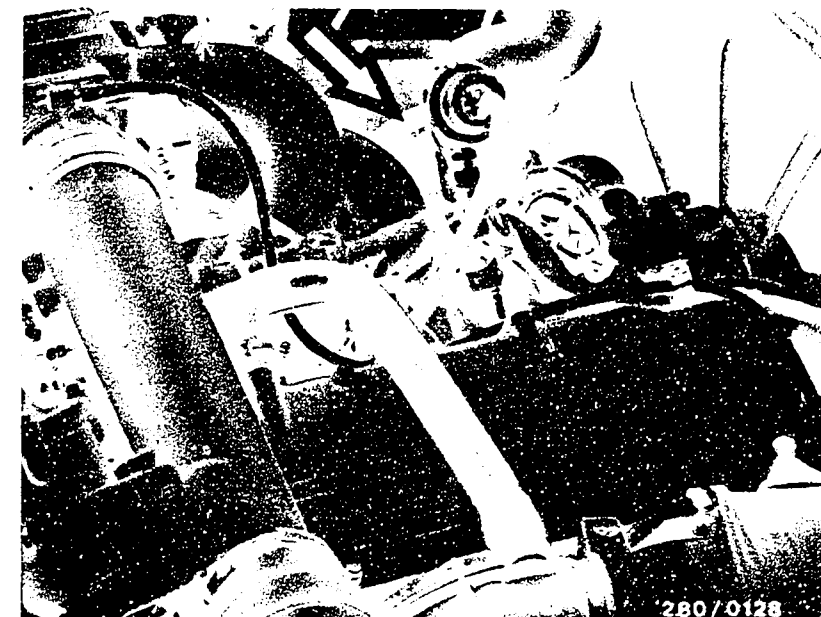
Test specification: Min. 1050 cm³/30 s

Remedy if test specification not reached:

- Fuel filter clogged → Replace
- Voltage at fuel pump plugs, with engine running, min 12 V. If not, clean contacts; possibly eliminate poor ground connection or replace leads.
- Fuel pressure regulator defective → Replace.
- Check the pre-supply pump
Check by listening:
Remove plugs from electric fuel pump. Ignition "ON", open air-flow sensor flap by hand. Pre-supply pump must operate. If not, check connecting lead and, if necessary, replace pre-supply pump.
- Fuel pump delivery too low → Replace fuel pump.

After testing is completed, refit pipe piece between air filter and air-flow sensor. Check connection for leaks and check ground lead on air-flow sensor.

Continued on K5/K6



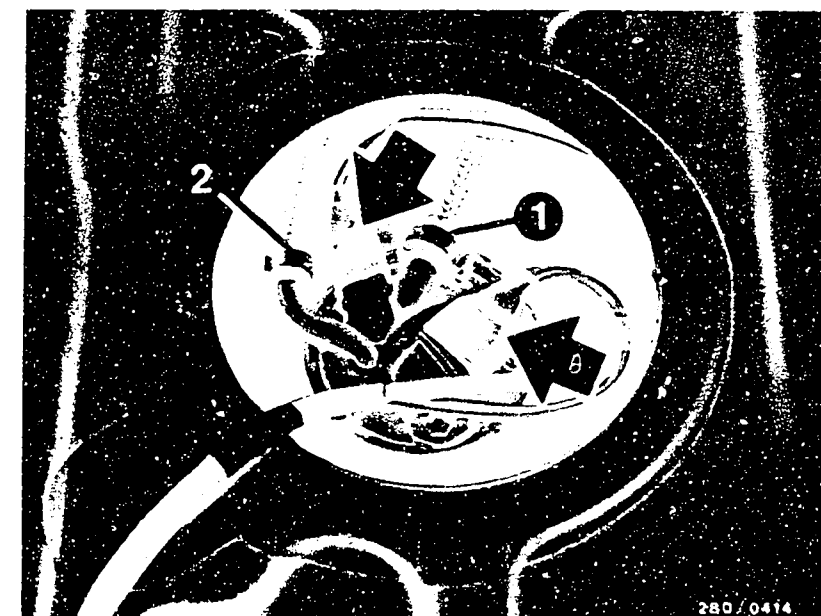
Arrow=Fuel return line

Pre-supply pump installed under mat in luggage compartment

1=Fuel delivery line to electric fuel pump

2=Fuel return line

Arrows=Plugs: 2-pole=Pre-supply pump, 3-pole=Dip-tube sender



K3

No maximum engine power

BMW 745i Turbo



K4

No maximum engine power

BMW 745i Turbo



No maximum engine power, top speed not reached (Continued)

Air-flow sensor O.K.?

No

Yes

Testing:

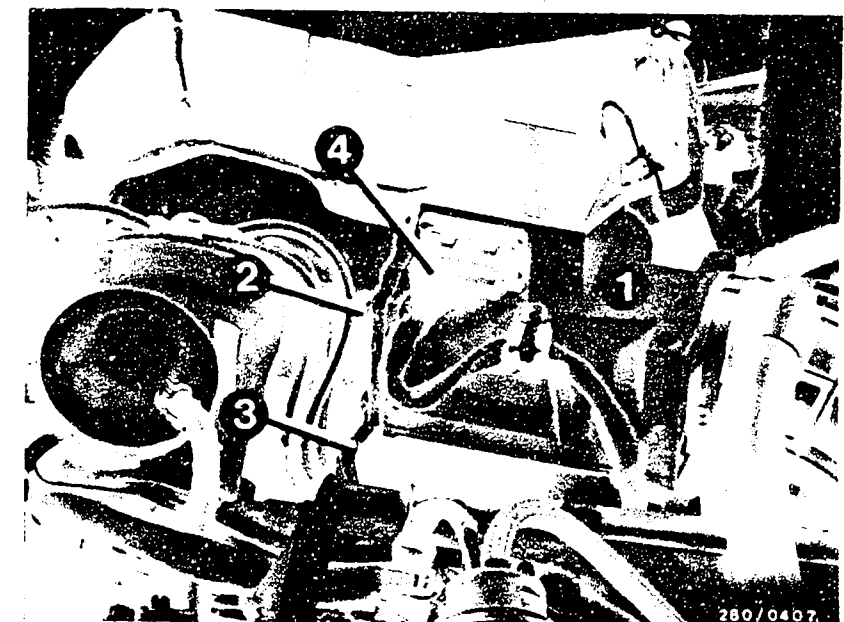
Unscrew pipe piece between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor. Connect ohm-meter to term. 7 and term. 8 of air-flow sensor. Measure resistance.

Deflect air-flow sensor flap.

Test specification: 200...1000 Ω

Caution!

After testing is completed, refit pipe-piece between air filter and air-flow sensor. Check connection for leaks and check ground lead on air-flow sensor.



1=Air-flow sensor

2=Connecting screws for pipe-piece

3=Ground lead

4=Plug

Continued on K7/K8

K5

No maximum engine power

BMW 745i Turbo



K6

No maximum engine power

BMW 745i Turbo



No maximum engine power, top speed not reached (continued)

Pressure switch tested?
(Not applicable as of 9.81
date of manufacture)

No

Testing:
Remove plug.
Connect ohmmeter to both terminals of pressure
switch.
Test specifications
1. With engine stopped: 0Ω
2. At idle: $\infty \Omega$
If the readings are O.K. but the pressure switch
does not work, test the connecting leads for con-
tinuity with ohmmeter.
Set value: approx. 0Ω

Yes

Engine-speed switch
(relay) tested?

No

Testing:
Connect the motortester (engine-speed range) volt-
meter between ground term. 31 and term. 1 on en-
gine-speed switch.
Start engine.

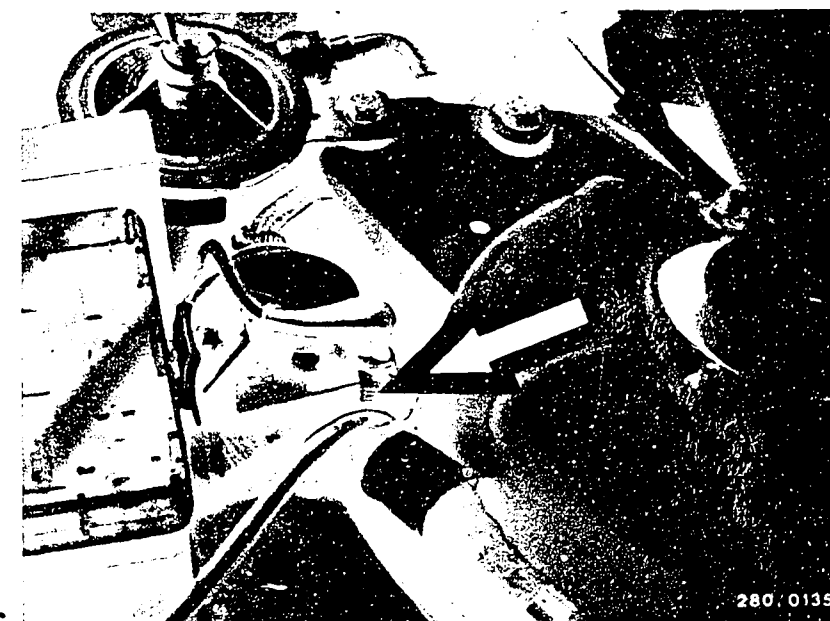
As of 9.80 date of manufacture (81 model):
As of 4000 min^{-1} ... 4300 min^{-1} there must be volt-
age (approx. 13 V).

As of 8.91 date of manufacture (82 model):
Up to 3050 ... 3550 min^{-1} there must be voltage
(approx. 13 V).

Trouble-shooting:
If readings differ at term. 2 and term. 5 on en-
gine-speed switch and engine-speed signal at term.
4 → Replace engine-speed switch.
If no voltage, test connecting leads for contin-
uity.

Yes

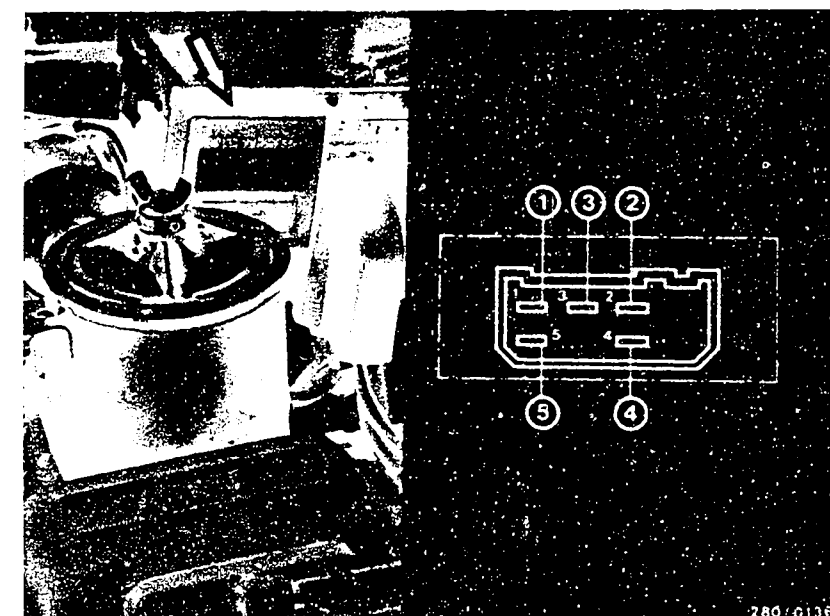
Continued on K9/K10



Arrow = Pressure switch

Arrow = Engine-speed switch

- 1 = To pressure switch
- 2 = To terminal 15
- 3 = To terminal 31
- 4 = To TCI trigger box
term. 16
- 5 = To terminal 15



K7

No maximum engine power
BMW 745i Turbo



K8

No maximum engine power
BMW 745i Turbo



No maximum engine power, top speed not reached (continued)

Are all hose lines and electric leads securely attached?
Visual examination. Is the air-intake system leak-tight?

No

Check whether hoses of air-intake system and of fuel line system are securely attached, not kinked, or damaged. If necessary, replace hoses. Eliminate leaks with new seals or by re-tightening the connecting screws.

Checking for leaks:

Seal off exhaust tail pipe. Screw off hose from air filter to air-flow sensor on air-flow sensor and seal off air-flow sensor duct. Pull off hose after auxiliary-air device and blow air (0.3 bar) into the intake manifold with a compressed-air gun. Seal off connection port on auxiliary-air device. Open throttle valve fully while doing this. Brush or spray all joints with soapy water. Bubbling or foaming indicates a leak. Check electric contacts for loose connection.

Yes

Testing completed for customer complaint

"No maximum engine power"

Further test information:
For testing the solenoid-operated injection valves see Coordinate H 9 onwards.

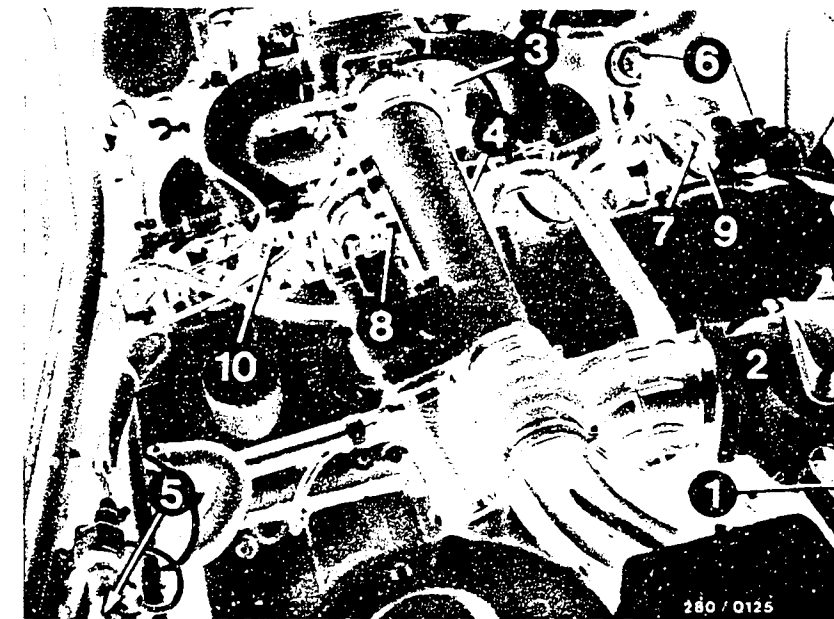
No

Further possibilities:

- Customer complaint incorrectly diagnosed.

If the fault has not been detected by "direct trouble-shooting", see "detailed trouble-shooting" (Coordinates B3/B4).

- Engine not mechanically O.K. (Compression, valve setting, valve timing, worn camshaft).



- 1 = Air filter
- 2 = Air-flow sensor
- 3 = Throttle-valve switch
- 4 = Start valve (blue plug)
- 8 = Auxiliary-air device

K9

No maximum engine power
BMW 745i Turbo



K10

No maximum engine power
BMW 745i Turbo



Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

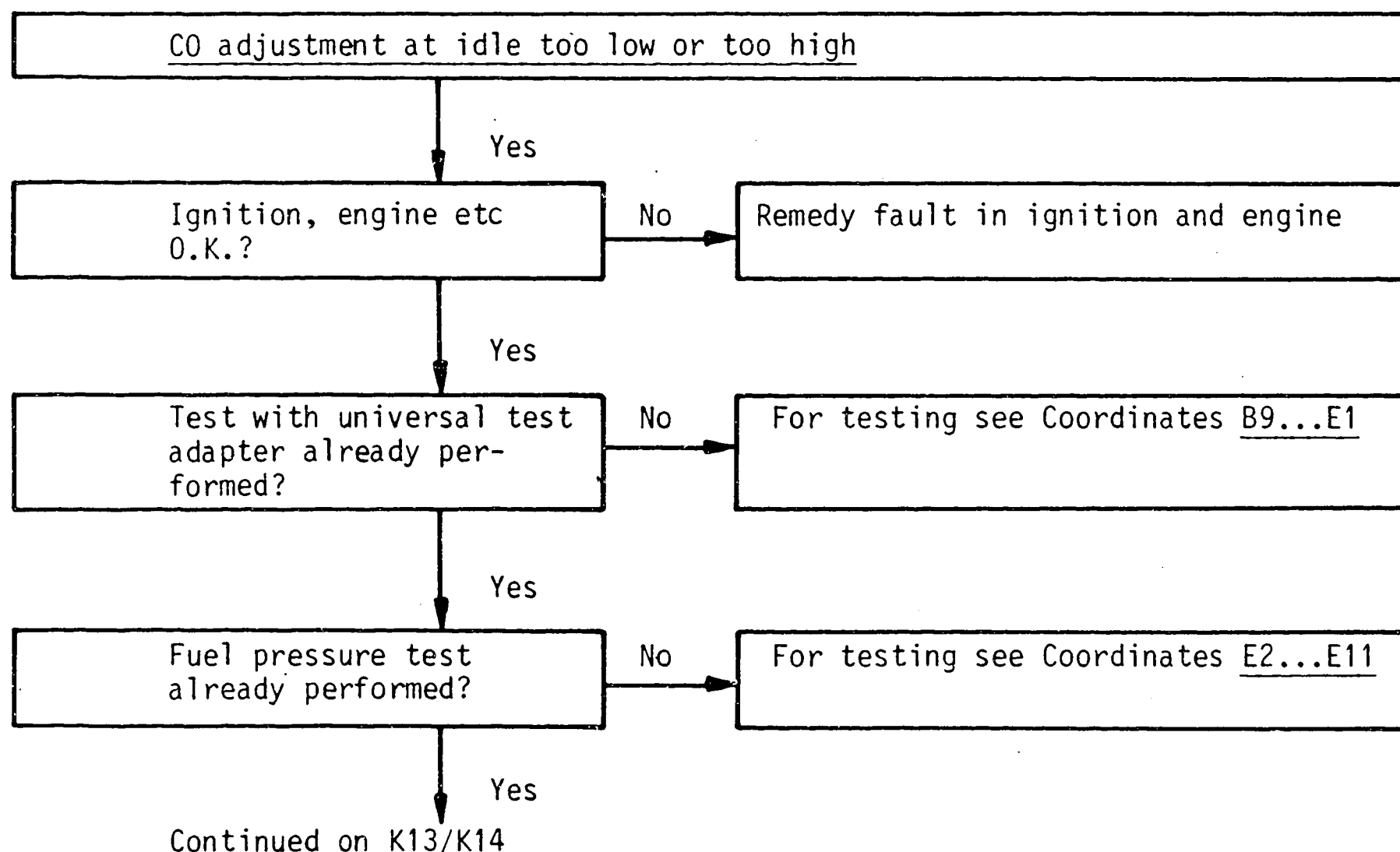
The program is divided into three rows of boxes:

1. The left-hand row contains the questions on the tests.
2. The middle row contains descriptions of the testing and adjustment operations on the components.
3. The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row and carry out the tests given there.

When you have finished testing, continue trouble-shooting at the point at which you branched off.



K11

CO adjustment
BMW 745i Turbo



K12

CO adjustment
BMW 745i Turbo



CO adjustment at idle too low or too high (Continued)

CO and engine speed correctly adjusted?

No

Co and idle adjustment

Exhaust-gas test with CO analyzer with engine at normal operating temperature and at idle speed

Idle speed

Manually-shifted transmission, automatic transmission (selector lever in position P):

800...900 min⁻¹

CO setting

81 model

(Ignition distributor No. 0 237 304 017):

0.5...2.0% by vol. CO

82 model

(Ignition distributor No. 0 237 306 047):

Less than 1.5% by vol. CO

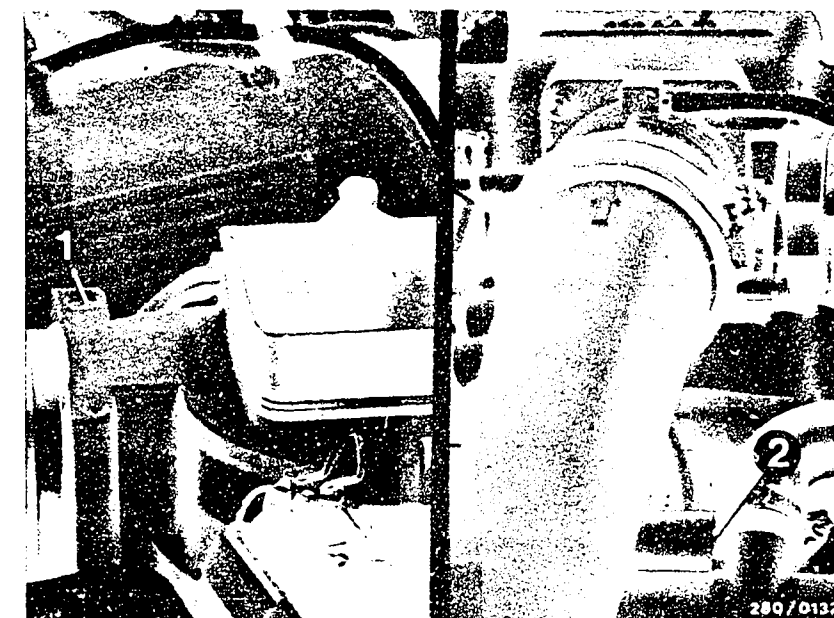
If CO concentration too high, turn bypass screw (CO adjusting screw) in air-flow sensor half a turn in a counterclockwise direction. Check engine speed and CO concentration again. Carry out adjustments in several steps. After adjusting, use new plugs.

Yes

Can engine speed not be adjusted?

Yes

Continued on K15/K16



1=CO adjusting screw

2=Idle-speed-adjusting screw

K13

CO adjustment
BMW 745i Turbo



K14

CO adjustment
BMW 745i Turbo



CO adjustment at idle too low or too high (continued)

Air-flow sensor O.K.?

No

Testing:

Unscrew pipe piece between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor. Connect ohm-meter to term. 7 and term. 8 of air-flow sensor. Measure resistance.

Deflect air-flow sensor flap.

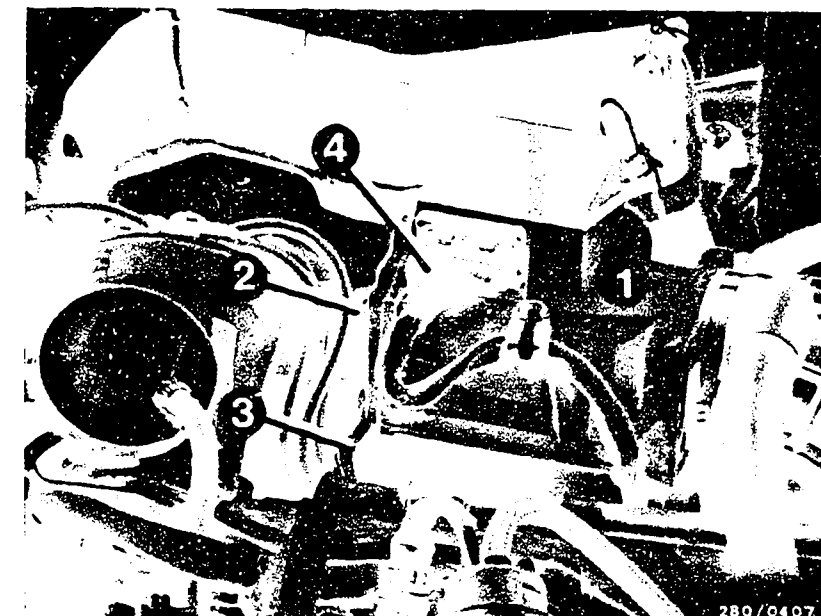
Test specification: 200...1000 Ω

Caution!

After testing is completed, refit pipe-piece between air filter and air-flow sensor. Check connection for leaks and check ground lead on air-flow sensor.

Yes

Continued on K17/K18



- 1 = Air-flow sensor
- 2 = Connecting screws for pipe-piece
- 3 = Ground lead
- 4 = Plug

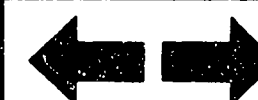
K15

CO adjustment
BMW 745i Turbo



K16

CO adjustment
BMW 745i Turbo



CO adjustment at idle too low or too high (continued)

CO concentration below tolerance?

As of 9.80 date of manufacture (81 model):
Max. 2.0% by vol. CO

As of 9.81 date of manufacture (82 model):
Max. 1.5% by vol. CO

Temperature sensors O.K.?

Start valve leak-tight?

No

Testing the temperature sensor:

Using ohmmeter, make direct resistance measurement at temperature sensor II (engine). Resistance measurement at term. 13 and term. 49 (ground);

at ambient temperature (approx. +15...+30°C): 1.3...3.6 kΩ
with engine at normal operating temperature (approx. 80°C): 250...390 Ω

If incorrect, check for open circuit or short circuit in following leads using ohmmeter: Multiple plug term. 13 to temperature sensor II term. 13 and temperature sensor II term. 49 to central ground (lead 49). Check all contacts in the plug-in connections.

Testing the start valve for leaks:

1. When installed

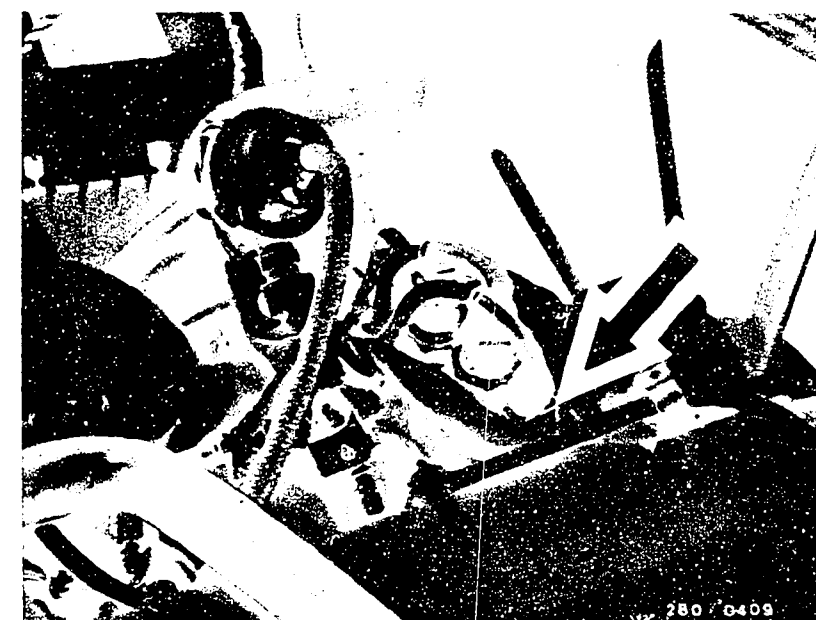
Pinch off the fuel delivery line to the start valve. If engine then runs smoothly, replace start valve.

2. When removed

Remove start valve (Caution! Fire hazard!). Fuel line and electric lead remain connected (place collector vessel under the start valve). Build up fuel pressure (remove hose between air filter and air-flow sensor. Ignition "ON" and deflect air-flow sensor flap).

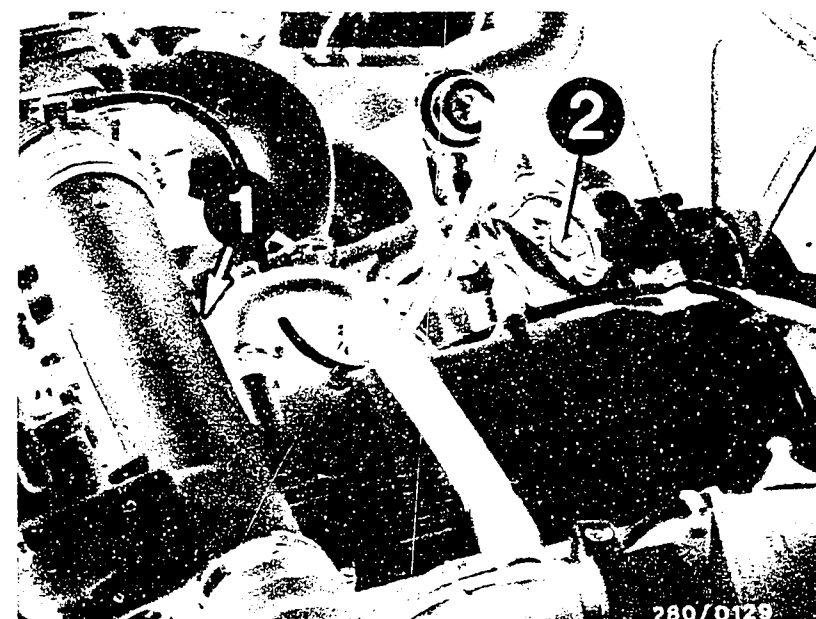
Yes

Continued on K19/K20



1 = Temperature sensor II (engine)

1 = start valve
2 = thermo-time switch



K17

CO adjustment
BMW 745i Turbo



K18

CO adjustment
BMW 745i Turbo



CO adjustment at idle too low or too high (continued)

CO concentration below tolerance?

As of 9.80 date of manufacture (81 model):
Max. 2.0% by vol. CO

As of 9.81 date of manufacture (82 model):
Max. 1.5% by vol. CO

Temperature sensors O.K.?
Start valve leak-tight?
(continued)

No

Test specification:

Within one minute max. 1 drop may form at the mouth of the valve.

Caution! After the test is completed, the hose piece between air filter and air-flow sensor must be fitted again. Make sure that there are no leaks and check the ground connection (ground lead) on the air-flow sensor.

Yes

CO concentration above 0.5% by vol.?

Air-intake system leak-tight?

No

Checking for leaks:

Seal off exhaust tail pipe. Screw off hose from air filter to air-flow sensor on air-flow sensor and seal off air-flow sensor duct. Remove hose after auxiliary-air device and blow air (0.3 bar) into the intake manifold with a compressed-air gun. Seal off connection port on the auxiliary-air device. Open throttle valve fully while doing this. Brush or spray all joints with soapy water. Bubbling or foaming indicates a leak.

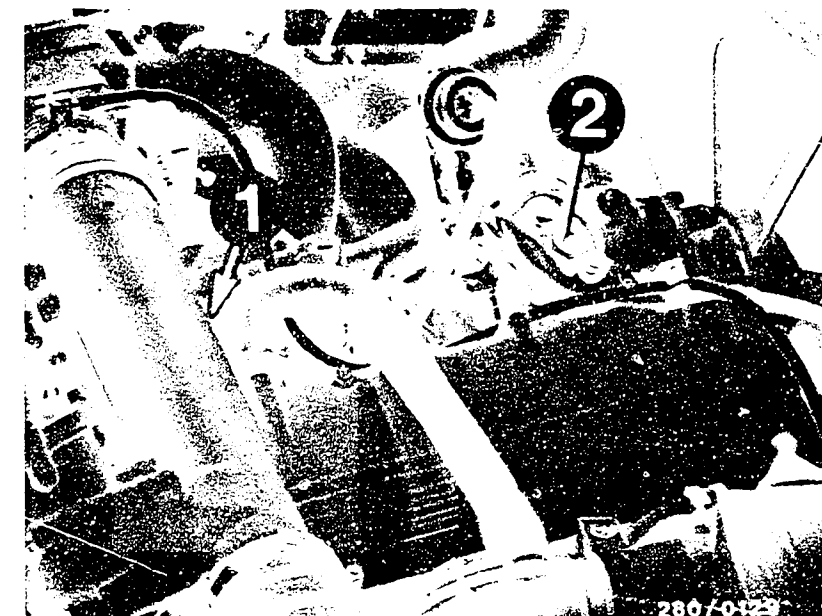
Yes

Testing completed for customer complaint
"CO adjustment".

No

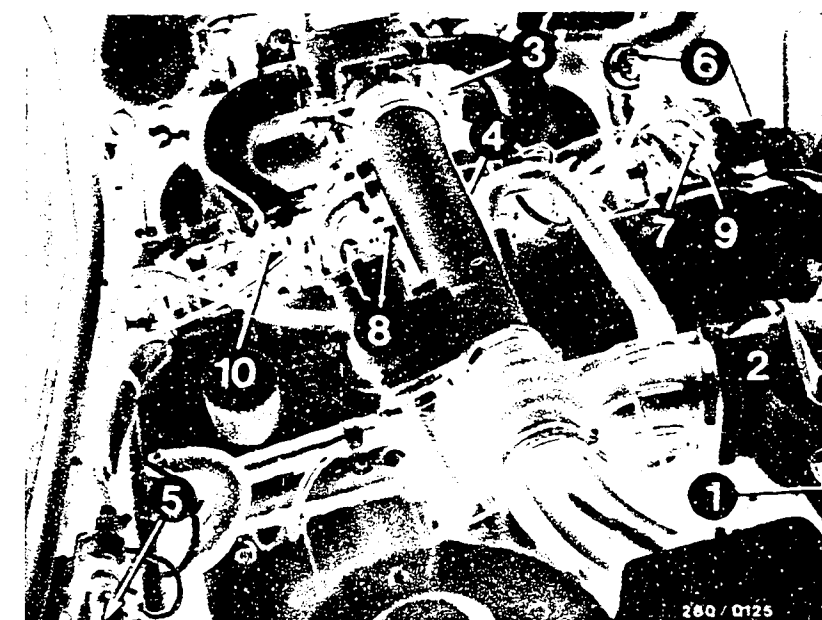
Further possibilities

- Customer complaint incorrectly diagnosed. (See coordinates B3...B8)
If the fault has not been detected by "direct trouble-shooting", see "detailed trouble-shooting" (Coordinates B3/B4).
- Engine not mechanically O.K. (Compression, valve setting, valve timing, worn camshaft).



1 = Start valve
2 = Thermo-time switch

1 = Air filter
2 = Air-flow sensor
3 = Throttle-valve switch
4 = Start valve (blue plug)
8 = Auxiliary-air device



K19

CO adjustment
BMW 745i Turbo



K20

CO adjustment
BMW 745i Turbo



After-sales Service

Motor Vehicle Service Information

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UNIVERSAL TEST ADAPTER

VDT-I-Gen. 1001 En

1.1982

1. Application

The multiplicity of different fuel-injection and ignition systems at present available on the market, as well as the advances in development which can be expected in the future, demand a new testing concept. In order to maintain the outlay for test equipment, and hence the costs, at a reasonable limit we have developed the universal test adapter.

The following systems can be tested using a test-adapter universal unit together with adapter leads suited to the system in question:

1.1 Systems which are already being fitted as series:

- L-Jetronic (1st generation)
- LE-Jetronic (2nd-generation L-Jetronic)
- Motronic (with the new connector designation, refer to the vehicle-specific instructions!)

1.2 Systems whose introduction is planned:

- Motronic with gearbox control
- KE-Jetronic
- Mono-Jetronic
- Electronic ignition system with ignition map (EZF)

2. Delivery dates and Part Numbers

Available as from 2.1982.

2.1 Universal test adapter (basic unit)

Part Number: 0 684 101 801

Designation: ETT 018.01

2.2 System adapter lead for LE-Jetronic (2nd-generation L-Jetronic)

Part Number 1 684 463 123

First application: For BMW 2.5/2.8 l engines as from 9.1981, and for Opel 2.0 l engines (Manta/Rekord) as from 9.1981.

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L1

Service Information

BMW 745i Turbo



2.3 System adapter lead for Motronic with new connector assignment.

(Refer to the vehicle-related instructions!)

Part Number : 1 684 463 124

First application: Porsche 944 as from series production, BMW as from about 3.1982 (Europe)

2.4 System adapter lead for L-Jetronic (in preparation)

Further system adapter leads will be made available along with the introduction of the new systems as mentioned above.

3. Testing procedure

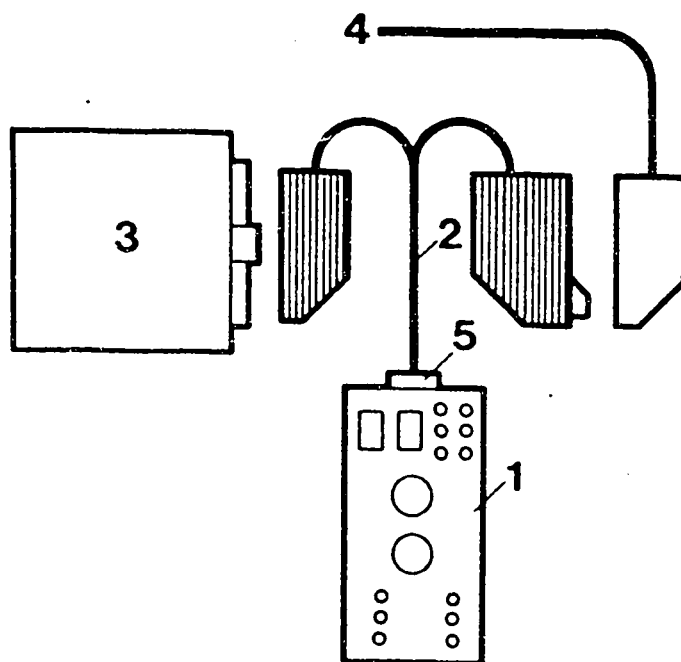
The systems and the components are tested for voltage and resistance values as well as for correct functioning. Evaluation is by means of a multimeter and the Motortester which are connected into the universal test adapter.

Depending upon the complexity of the system, interchangeable adapter lead model 1 or model 2 is provided:

3.1 Adapter lead for peripheral and function testing (Model 1)

The universal test adapter together with the system adapter lead is to be connected to the system wiring harness and to the control unit (e.g. Motronic).

To be tested: Wiring harness with components and control unit.



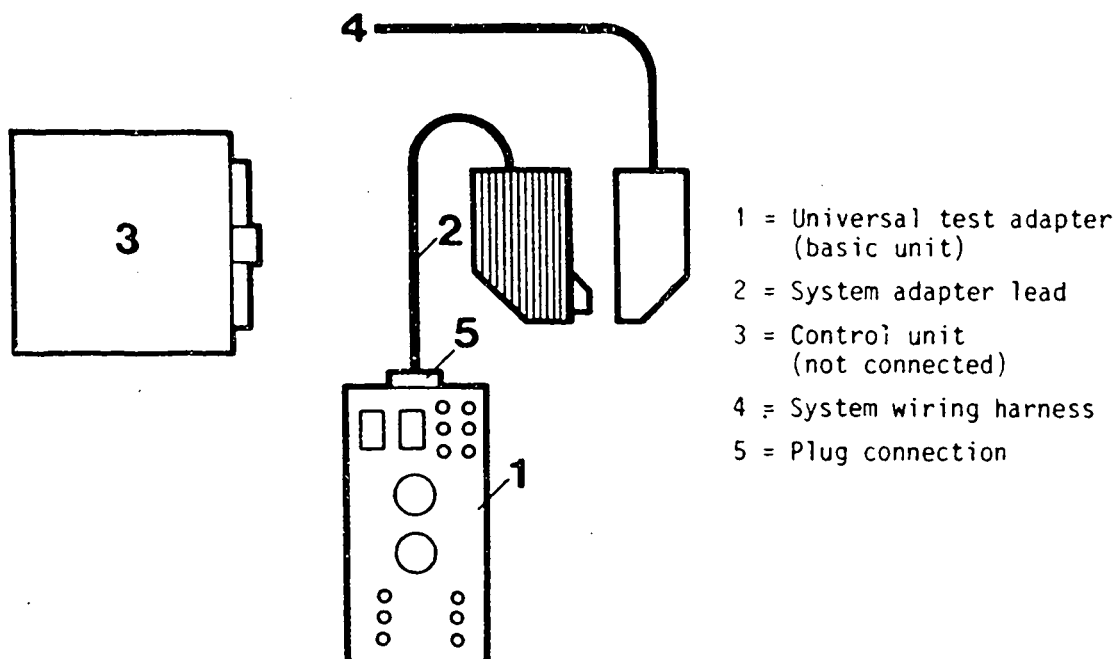
- 1 = Universal test adapter (basic unit)
- 2 = System adapter lead (Y-version)
- 3 = Control unit
- 4 = System wiring harness
- 5 = Plug connection



3.2 Adapter lead for peripheral testing (Model 2)

The universal test adapter with system adapter lead, is only to be connected to the system wiring harness (e.g. LE-Jetronic (2nd-generation L-Jetronic)).

To be tested: Wiring harness with components (without control unit).

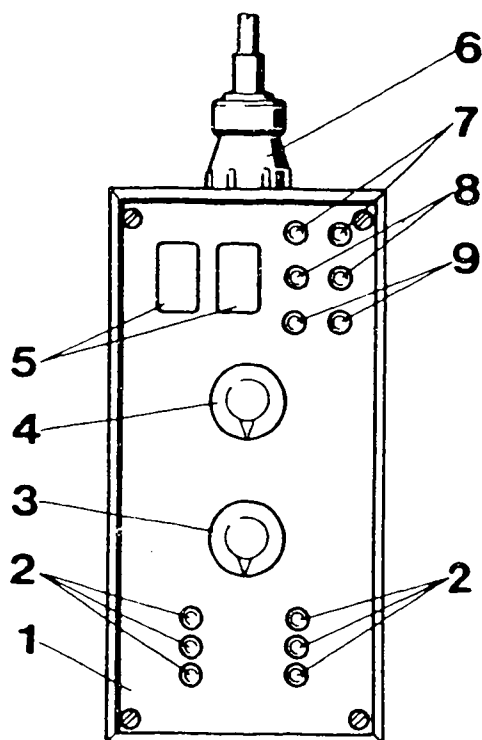


4. Construction of the universal test adapters

The universal test adapter is fitted with 2 program switches footage and resistance measurement. The measured values are displayed on the multimeter connected to the universal test adapter. For reasons of safety, the voltage and resistance sockets are separated. In order to measure signals (e.g. injection pulses, ignition pulses), it is necessary to connect a Motortester to the measuring cavities (special input).

When carrying out functional tests with the control unit connected, selected push-buttons are pressed in a number of test-program steps in order to simulate a variety of different engine operating conditions the influence of which is evaluated using the Motortester.





- 1 = Universal test adapter (basic unit)
- 2 = Keyboard for simulation of various conditions e.g. engine temperature, throttle position etc.
- 3 = Program switch "Ohm" for resistance measurement
- 4 = Program switch "Volt" for voltage measurement
- 5 = Measurement "cavities" (for the special input from the Motortester)
- 6 = 63-pole plug-in connection for connecting the system adapter lead
- 7 = Measurement sockets (voltage measurement with a multimeter or with the Motortester)
- 8 = Measurement sockets (resistance measurement with the multimeter)
- 9 = Sockets for special functions (not yet allocated)

Notes:

1. The Motronic test adapter (0 684 101 800, ETT 018.00) will continue to be used for Motronic-equipped BMW vehicles (with old connector assignment) up to about year of manufacture 3.1982 (refer to vehicle-specific instructions).
2. Details on the operation of the universal test adapter, and the test specs, are to be found in the vehicle-specific after-sales service instructions.

3. Caution! Change of Part Number:

On the SIS-microfiches OPE-00/J22 (Coordinates A14 and A17) the new Part Numbers are as follows:

Universal test adapter: 0 684 101 801

Adapter lead : 1 684 463 123



After-sales Service

Motor Vehicle Service Information

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BMW PASSENGER CARS WITH L-JETRONIC

VDT-I-BMW 027 En

Fuel-pump noise

7.1980

Just lately, in the case of a number of different BMW passenger cars fitted with L-Jetronic, noises have occurred which are very similar to those originating from fuel-supply pumps. This noise though, stems from hydraulic vibrations in the fuel lines when the injection valves inject.

Remedy:

1. Check the routing of the fuel lines from the fuel tank to the engine compartment. They must have no direct contact with the bodywork.
2. Fit a diaphragm damper 0 280 161 006 in the fuel-return line on the fuel-tank side of the pressure regulator. Attach to the bulkhead. If necessary, lengthen the fuel line.

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L5

Service Information
BMW 745i Turbo



After-sales Service

Motor Vehicle Service Information

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BMW 745 i (TURBO)
with L-Jetronic and breakerless
transistorized ignition TCI-i

VDT-I-BMW 034 En

12.1980

Delivery of vehicles from April 1980

Engine M 102	: 6 cyl. with exhaust turbo-supercharger
Engine swept volume	: 3.2 l
Output	: 185 kW (252 HP)
Rated speed	: 5200 min ⁻¹
Ignition point (without vacuum)	: 37° before TDC at 2000 min ⁻¹

Equipment

Ignition distributor	: 0 237 304 017
Trigger box	: 0 227 100 025
Ignition coil	: 0 221 122 010

Turbo-supercharger

The exhaust turbo-supercharger with a turbo factor of 1.4 reaches the maximum charge-air pressure of 0.6 bar at 2500 min⁻¹. By means of a bypass valve, a control on the exhaust side stops the maximum charge-air pressure from being exceeded. The charge-air temperature is reduced by a cooling device by more than 40 degrees. In this way the volume of air is reduced and at the same time a better filling of the cylinder is achieved.

L-Jetronic

As a speciality the control unit has an overrun cutoff.
Method of operation: If the engine overruns at more than 1200 min⁻¹, the fuel supply will be interrupted by the control unit (fuel economy).
The other L-Jetronic components will be familiar from previous systems.

Technical documentation

Equipment: microfiche
Test instructions: in preparation.

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Service Information

BMW 745i Turbo



After-sales Service

Motor Vehicle Service Information

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BMW 745i TURBO

VDT-I-BMW 036 En

Failure of L-Jetronic control unit

3.1981

(Replaces Ed. 2.1981)

If the three-pin plug of the trip computer is plugged in wrongly (wrong polarity), the final stage of the L-Jetronic control unit will be damaged when starting.

Result: the engine does not run or runs very unevenly.

In such cases no claims for guarantee will be accepted.

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L7

Service Information

BMW 745i Turbo



After-sales Service

Technical Bulletin

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New Product

(Exhaust Turbo-Supercharger System)

28

VDT-I-280/3 En

3.1981

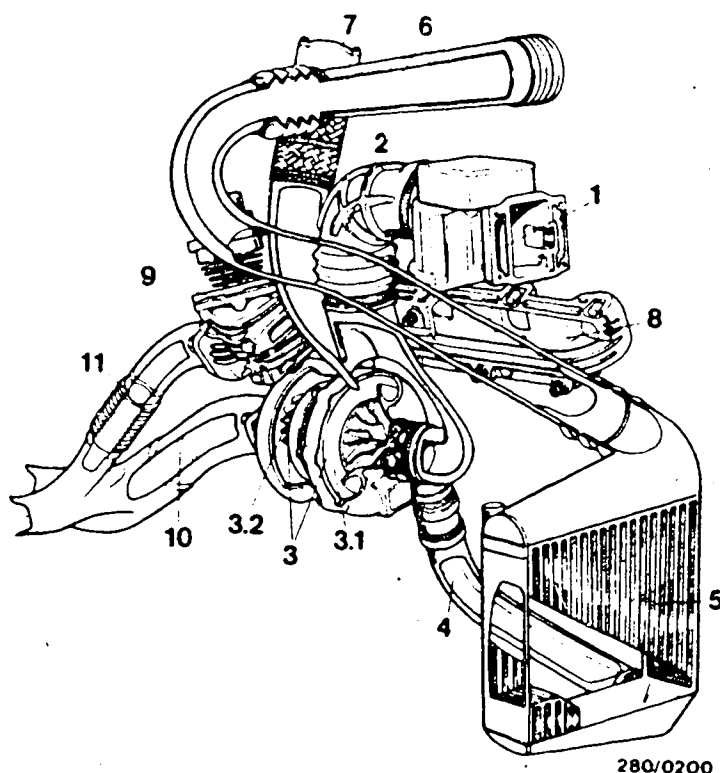
L-Jetronic with exhaust turbo-supercharger

As from September 1980, BMW have been delivering the 745i model equipped with L-Jetronic and an exhaust turbo-supercharger.

General:

The engine already in use in the 733i model, with L-Jetronic and a swept volume of 3.2 l, has been retained.

The intended increase in engine power has been achieved by fitting an exhaust turbo-supercharger specially adapted to this particular engine. The type designation 745i was chosen by BMW to signify this increase in power.



- 1 = Air-flow sensor meters the air drawn in
- 2 = Intake tube
- 3 = Exhaust turbo-supercharger, comprising the turbine (3.2) which is driven by the exhaust-gas stream, and the compressor (3.1) which is rigidly fixed to the turbine.
- 4 = Charge-air tube
- 5 = Charge-air cooler
- 6 = Charge-air intake connection
- 7 = Air-control valve for controlling the charge-air pressure during overrun
- 8 = Exhaust manifold
- 9 = Bypass valve
- 10 = Exhaust pipe
- 11 = Exhaust bypass duct

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L8

Technical Bulletins

BMW 745i Turbo



Functional description of the exhaust turbo-supercharger:

The turbine (3.2) is driven by the speed of the exhaust gas. The turbine and the compressor (3.1) are rigidly connected to one another. The air is drawn in by the compressor through an intake-noise damper (1) on the air filter and then through the air-flow sensor (2). Following the compressor, the compressed air is routed to the charge-air cooler (4). Here it is cooled down and then drawn into the individual cylinders of the engine through the charge-air intake connection, the throttle valve and the intake manifold (9).

Due to the fact that the charge-air pressure must not exceed approx. 0.7 bar, it has to be controlled. This is carried out by means of a bypass valve (6) at the exhaust manifold. The compressor and the bypass valve are joined by a control line (7). The turbine and the bypass valve are connected by a pipe to the exhaust system (8). As soon as the charge-air pressure becomes excessive, the bypass valve opens and permits a fraction of the exhaust gas to be diverted to the bypass duct of the exhaust system. As a result, the pressure applied to the turbine becomes less and the charge-air pressure sinks.

The compressor operates when the throttle valve is closed (and particularly during the actual closing process), this can lead to unwanted pressure shocks in the charge-air intake connection. These are prevented by the air-control valve (5). The air-control valve is connected to the intake manifold by a vacuum hose. The vacuum which is generated when the throttle valve closes opens the air-control valve and the charge air is diverted through the bypass line to the intake side of the compressor.

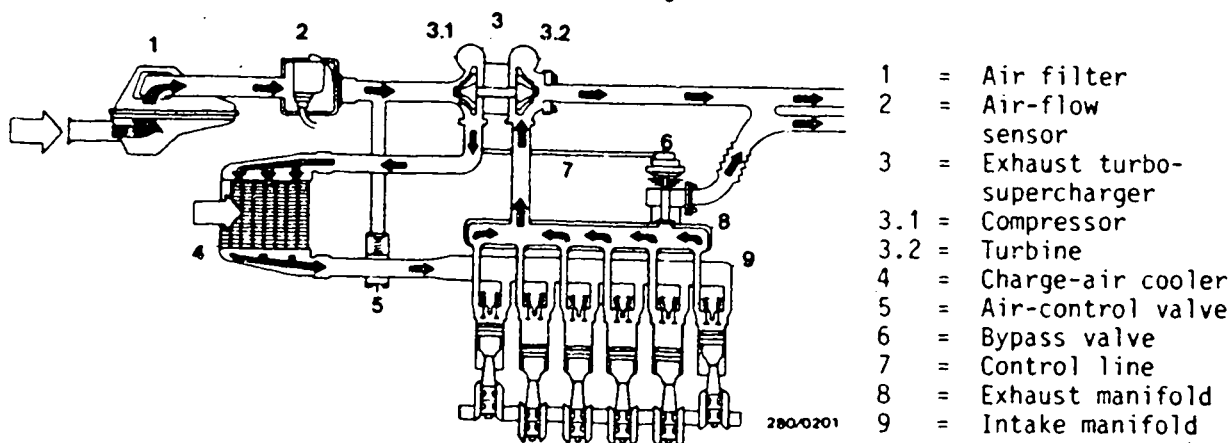
Functional description of the charge-air cooler:

When the intake air is compressed in the turbo-supercharger compressor its temperature increases considerably.

This increase in intake-air temperature has two disadvantages:

1. The density of the air drops along with the rise in temperature and, as a result, the cylinder charge as well.
2. The combustion-chamber temperature rises and with it the thermal loading of the engine.

These disadvantages are prevented by the charge-air cooler.



Differences in the fuel induction of this turbo-supercharged engine to that of the normally aspirated L-Jetronic engine

In order to increase the engine power, the following measures are necessary:

The metering range of the air-flow sensor has been extended by fitting a stronger counterspring at the sensor flap. The injected fuel quantity has been adapted to the increased intake-air quantity by raising the fuel primary pressure during pressure-charged operation and by increasing the cross-sectional area of the fuel-injection valves.

Three additional control-unit functions have been incorporated in the turbo-supercharged engine:

1. Engine-speed limitation is by means of injection-pulse switch-off instead of through the ignition-distributor rotor as is usually the case. The advantage of this method lies in the fact that in the switched off range no unburnt fuel can get into the exhaust system and, under certain conditions, burn there.
2. During overrun, with the throttle valve closed (idle contact in the throttle-valve switch closed) the supply of fuel is interrupted up to an engine speed of 1200 min^{-1} by switching-off the injection pulses to the fuel-injection valves.
3. A safety circuit stops the supply of fuel to the engine, in case of excessive turbo-supercharger pressure, by switching-off the fuel-injection valves.



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CAR ALARM II, RETROFITTING

for vehicles equipped with L-Jetronic

VDT-I-280/103 En

7.1981

Supersedes Ed. 9.1980

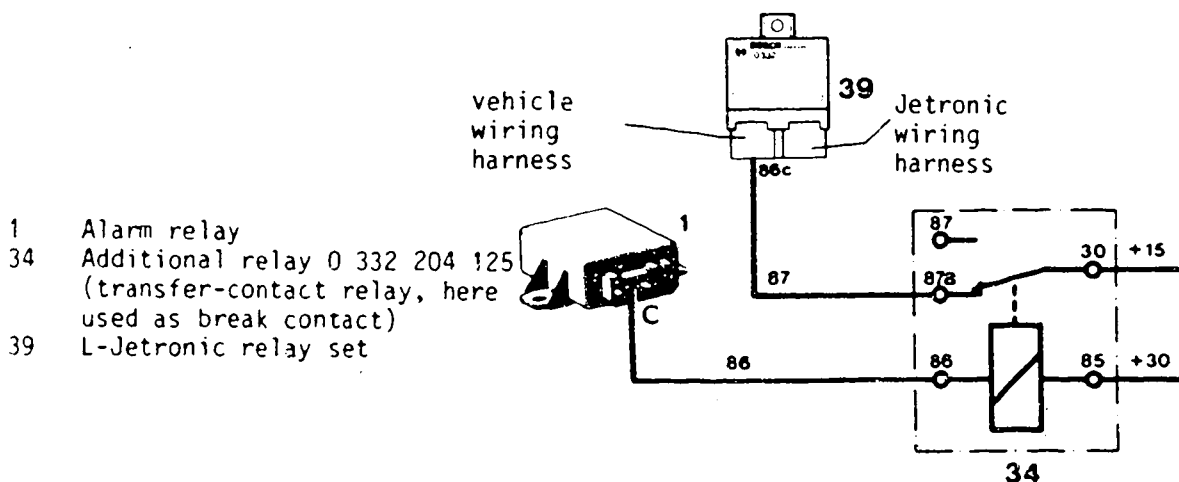
In cases where Car Alarm II (0 335 411 901) is retrofitted in vehicles equipped with L-Jetronic, the terminal 1 of the ignition coil must NOT be connected to terminal "C" of the alarm relay. When the Car Alarm is switched on, terminal "C" of alarm relay is switched internally to vehicle ground. This would mean that when attempts are made to start the vehicle with the alarm switched on, the ignition coil and the L-Jetronic control unit would be destroyed. This also means though, that full protection against theft is no longer possible as would normally be the case with the ignition switched off and with the alarm installation primed.

A circuit has now been developed which ensures complete theft protection for L-Jetronic vehicles as well.

Description of the circuit

Open-circuit the line "15" leading to terminal "86c" of the relay set using an additional relay (34) 0 332 204 125. This relay ensures that when the alarm installation is primed, the supply voltage to the control unit is switched off and hence the control unit no longer functions.

The additional relay (34) 0 332 204 125 is controlled by terminal "C" of the alarm relay (see circuit diagram).



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BMW 745i Turbo



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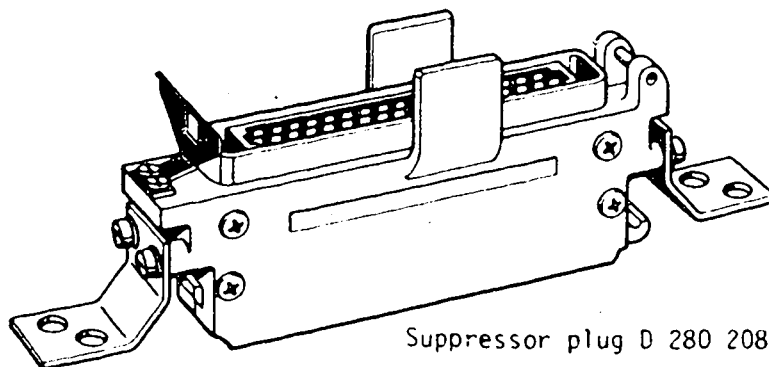
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PERMANENTLY INSTALLED AND PORTABLE TRANSMITTER
INSTALLATIONS FITTED IN VEHICLES EQUIPPED WITH
L-JETRONIC

VDT-I-280/106 En
4.1981

If, in vehicles equipped with L-Jetronic and in which transmitter installations are operated, whether permanently installed or removable and portable, malfunctions occur whilst the vehicle is being driven (the engine shakes or stops etc.), the following measures can be taken to remedy these faults:

- The hinges for the engine hood and the luggage-compartment lid are to be bridged with a flexible copper braided grounding strip (efficient grounding!).
- The antenna base is to be connected to the vehicle chassis using a copper grounding strip to ensure clean, 100% connection.
- Locate the transmitter and its antenna as far away as possible from the L-Jetronic control unit.
- Tune the transmitter to the antenna in order to achieve the minimum reflection coefficient.
- The parallel routing of the cables for the transmitter power supply and the antenna with the L-Jetronic wiring harness is to be avoided (danger of cross-coupling and cross-talk).



Suppressor plug D 280 208 091

If the disturbances and complaints continue even though the above measures have been taken, then the degree of suppression can be improved by incorporating the suppression plug D 280 208 091 between the wiring-harness plug and the L-Jetronic control unit.

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Ordering

REGE/AV is to order direct from KH/VKD2.

Price

Available upon request.

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DETERMINATION OF THE TEMPERATURE VALUES
GIVEN IN L-JETRONIC MANUALS

VDT-1-280/108 En
5.1982

We have recently been asked with increasing regularity how accurately the engine temperature must be measured when trouble-shooting on the vehicle.

So far in its L-Jetronic manuals KH/VSK has given three or four different temperatures for testing the temperature sensor:

-10 °C, +20 °C, +40 °C and +80 °C,

and two ranges for the thermo-time switch e.g. 35 °C 8 sec.

below +30 °C and above +40 °C.

Since the temperature range need not be subject to such close tolerances, we propose in future the following more appropriate definition:

- Ambient temperature (approx. +15 °C to +30 °C)
- Engine at normal operating temperature (approx. +80 °C).

Please direct questions and comments concerning the contents to our authorized representative in your country.

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VDT-I-280/110 En

6.1983

PARTS SET FOR INJECTION VALVES

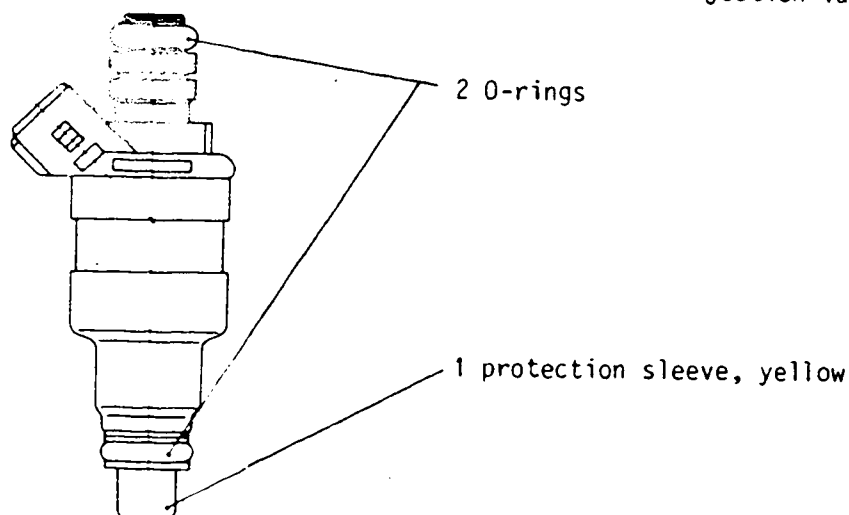
Supersedes 6.1982 edition

0 280 150 2..

AND PRESSURE REGULATORS 0 280 160 2..

A common parts set is available for the L-Jetronic/LE-Jetronic solenoid-operated injection valves and pressure regulators with the new method of connection.

Contents for 1 injection valve:



Contents for 1 pressure regulator:

1 O-ring

1 supporting plate

Since the above-mentioned parts are subjected to extreme temperature stress, they should be exchanged for new parts whenever servicing is carried out.

"Unmetered air" sucked in through injection-valve seals which are not tight, is a frequent case for servicing.

The parts set has the part number 1 287 010 704 and will in future be listed in the service parts microfiche under solenoid-operated injection valves (see EE 00 under 0 280..).

Please direct questions and comments concerning the contents to our authorized representative in your country.

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PLUG-AND-SOCKET CONNECTORS FOR JETRONIC COMPONENTS

Parts sets

VDT-I-280/111 En

11.1982

(Replaces Ed. 7.82)

Parts sets are available for replacement Jetronic plug-and-socket connectors.
The parts sets comprise:

- Connector housing
- Protective cap (rubber sleeve)
- Contact springs

These parts sets are listed on microfiche EE...*.

* See microfiche EE00 under 0 280 ..

- Plug, black, 2-pin, parts set 1 287 013 002 cable connector in conjunction with socket, 2-pin
- Socket, black, 2-pin, parts set 1 287 013 001 for e.g.:

Temperature sensor	0 280 130 0..
Auxiliary-air device	0 280 140 ..
Thermo-time switch	0 280 130 2..
Start valve	0 280 170 ..
Warm-up regulator	0 438 140 ..

- Socket, grey, 2-pin, parts set 1 287 013 003 for:

Solenoid-operated injection valve 0 280 150 ..

- Socket, black, 3-pin, parts set 1 237 000 039 for:

Throttle-valve switch 0 280 120 ..

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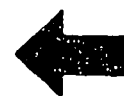


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